

Class No

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PAPERS

RELATING TO

THE SUPPLY OF MAKRANA MARBLE

FOR THE

VICTORIA MEMORIAL HALL,

CALCUTTA.



SIMLA :

PRESS OF THE PRIVATE SECRETARY TO HIS EXCELLENCY THE VICEROY.

1905.

PAPERS RELATING TO THE SUPPLY OF MAKRANA MARBLE FOR THE VICTORIA MEMORIAL HALL.

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SUPPLY OF MAKRANA MARBLE FOR THE VICTORIA MEMORIAL HALL.

No. 1.

Extract paragraph 2 (2) from a Note by His Excellency the Viceroy on the present state of affairs with regard to the Victoria Memorial Hall, enclosed in letter to Viscount Esher dated 6th February 1902.

* * * * *

2 (2). In one of my speeches last year, I indicated that the material of the Hall should, in all probability, be pure white marble. This is recommended on the grounds of its intrinsic purity and beauty, because of its peculiar suitability to the surroundings of a great park and a garden, and because a marble surface, capable of receiving a polish, is more likely to resist the influences of a moist climate than ordinary stone. The choice then indicated appears to have been universally ratified by public opinion; and there will probably be few to dissent from it. An examination has been made of the leading Indian quarries of white marble, which are to be found in the Rajput States. Their capacity is no longer what it was in the days when they are alleged to have provided the material for the Taj and the Pearl Mosques of Agra and Delhi. It does not appear to be likely that slabs of any great size could now be procured from them. There is a good deal of streaky discolouration in the modern marble, and a continuous wall surface of uniform tint and texture could not easily be obtained. But the greatest obstacle to the employment of Indian marble on a very extensive scale is the cost of land transport by rail to Calcutta. This is absolutely prohibitive. I may give an illustration. When I was ordering the white marble reproduction of the Holwell Monument, which I am about to erect at the corner of Dalhousie Square, I procured estimates both from the Rajputana quarries and from Europe. I found that an Indian firm, procuring the marble from Rajputana, could only land the completed monument in Calcutta at a cost nearly half as great again as the same article could be quarried, chiselled, and shipped from Italy, and deposited on the Calcutta wharves. When we come to deal with the enormous amount of marble that will be required for the Victoria Hall, and the far more excessive sums of money at our disposal, the question of cost becomes a serious consideration. Nevertheless, although the bulk of our marble may have to be imported from outside, I think that, as far as possible, we should make use of Indian material, and I am prepared to employ the Jaipur and Jodhpur or other marbles to the fullest degree compatible with the capacity of the quarries, qualified always by the consideration of expense. Among the foreign marbles to which we may have to recourse, I have compared specimens of the Greek and Italian marbles. The latter from the Carrara, Sicilian, and other quarries are well known. The most famous Greek marbles were the Parian and Pentelican. The marble of which the Parthenon was built is still hewn from the slopes of Pentelicus at a distance of a few miles from Athens. The Parthenon is unquestionably the most beautiful white marble edifice in the world, always with the exception of the Taj; and the Pentelic marble is as good as it ever was. Its richness of texture, the faint streaks of iron pyrites in its composition, relieving the dullness of absolute white, and giving it a sort of sunny radiance, as contrasted with a glassy and soulless lustre of the Italian marble, render it peculiarly suitable for a building on a large scale.

(2)

No. 2.

Dated 13th February 1902.

From—J. DOUGLAS, Esq.,

To—SIR W. LAWRENCE, K.C.I.E.

Will you kindly permit me to notice to you a point referred to in His Excellency's recent note in connection with the Victoria Memorial Hall, *viz.*, the cost of land transport of marble by rail to Calcutta.

Our rates are undoubtedly high, working out as they do in some cases to nearly Rs. 100 per ton from Agra to Calcutta. These rates, however, were fixed to meet small consignments of sculptured, &c., marble carried at owner's risk; but for the very large quantity which would be required for the Victoria Hall, I should be pleased to quote a rate for full wagon loads, at owner's risk, of say Rs. 15 per ton Agra to Howrah, or Calcutta, *plus* handling charges at each end.

I should also be very pleased on hearing from you to refer to the Rajputana-Malwa Railway as to rates over that line to Agra.

No. 3.

Dated 14th February 1902.

From—SIR W. LAWRENCE, K.C.I.E.,

To—J. DOUGLAS, Esq.

The Viceroy desires me to thank you for your letter of yesterday. He is very anxious to use as much Indian marble as possible and when the time comes will remember your quotation. Would you very kindly make the reference suggested to the Rajputana-Malwa Railway?

No. 4.

Dated 4th April 1903.

From—W. C. G. RENTON, Esq., Sikar, Rajputana,

To—The HON'BLE MR. E. CABLE, Messrs. Bird & Co., 5 Clive Row, Calcutta.

As the Bill for the Victoria Memorial Hall had been finally passed and the Committees are being appointed, I have no doubt the work of construction will now no longer be delayed than absolutely necessary.

2. As you are the President of the Bengal Chamber, and one of the Trustees of the Victoria Memorial Hall, I have the pleasure of addressing you on the subject of supplying Makrana marble for its construction.

3. I have no doubt you are aware that the Makrana marble of Jodhpur State is the best marble in the world and that all other white marble, including the white marble of European and American countries, is *eclipsed* before it, and that the Victoria Memorial Hall will be chiefly constructed in Makrana marble.

4. As I am *the only* and *the largest* exporter of Makrana marble, in all shapes and forms, to all parts of India, I shall be glad to render service in this line you may be pleased to confer on me, or recommend me to its proper Committee, or to your Contractors. Since the year 1884 all the best quarries at Makrana are at my orders and disposal. I have sent to your address by postal parcel post a sample of the first quality of Makrana marble. I hope the parcel will reach you safe.

5. I have just received intimation from Bombay, Baroda and Central India Railway offices that the railway freight on Makrana marble, intended for

Victoria Memorial Hall at Calcutta, is greatly reduced. I give below, as intimated to me, the reduced rates to Howrah for Calcutta, per ton :—

			Rs.	a.	p.
(a)	Over Jodhpur-Bikaner Railway	... ..	0	11	3
(b)	Over Bombay, Baroda and Central India and Rajputana-Malwa Railways, <i>viâ</i> Agra	... ..	4	0	0
(c)	Over East Indian Railway to Howrah	... ..	15	0	0
TOTAL PER TON			19	11	3

6. All your orders whether for Victoria Memorial Hall or your private constituents in Calcutta or elsewhere, I need not say, will be examined, passed and loaded in railway trucks at Makrana Railway Station, in accordance with your requisition and indents, under my personal and immediate supervision.

Soliciting the favour of an early reply and patronage.

No. 5.

Dated 14th April 1903.

From—W. C. G. RENTON Esq., Sikar, Rajputana,

To—The HON'BLE MR. E. CABLE, Messrs. Bird & Co., 101-1, Clive Street, Calcutta.

I am in receipt of your favour of 8th instant.

2. You want to know of what marble the Taj was built. No one can deny that it was built from Makrana marble, and that the marble was taken all the way along to Agra when the rail-roads were unknown, and not only the Taj, but all other notable monuments of genius throughout India are executed in Makrana marble. The sample I sent you is from the same quarry from which the Taj was built—the ancient quarries were levelled to the ground but they have just been cleared at very heavy expense for the supply of the increasing demand of Makrana marble just now in India.

3. I do not know whether you are aware or not that Makrana marble now, more or less, Europe imports it, and for all its high class and costly workmanship only.

4. There is not the slightest doubt that the Makrana marble, though it is dearer, is the best marble in the world and that the Italian, Grecian and marbles of other European and American countries are really eclipsed before Makrana, inasmuch as it is more lustrous and keeps its lustre and permanent colour of its whiteness for ages, which quality is not to be found in any other marbles of the world. All other marbles lose their whiteness by exposure to light and air and become yellowish, but this defect is not to be found in Makrana marble. As a proof, see the Taj, Etmad-Dowla, and Shaik Salem Chisti's tomb, all at Agra.

5. My Europe friends write to me that Mr. Pierpont Morgan is about building a marble Museum near his New York residence and they expect marbles from all parts of the world will be collected and separate quarters will be built of each marble, and as the Americans have much approved of Makrana marble my Europe friends expect to send me a very large order for America.

6. Taking all the circumstances of the construction of All-India Victoria Memorial Hall at Calcutta it will be no small disappointment, I am positive, to the majority, that all the money collected to be sent to other countries for marble and the best marble in the world which India produces is not to be used.

7. As a Trustee of the Memorial and Chairman of the Bengal Chamber, I hope you will kindly put the matter into your kind consideration, and if the Victoria Memorial Hall is to be styled the second Taj, Makrana marble must be used chiefly or at least for all its outside work.

8. Soliciting the favour of further commands and which will always have my prompt attention.

No. 6.

No. 2682, dated Calcutta, 15th April 1903.

From—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial,

To—W. C. G. RENTON, Esq., Sikar, Rajputana.

As desired by Mr. Cable, I have the honour to acknowledge with thanks your letter, dated 4th April 1903, offering your services to supply Makrana marble for the building of the proposed Victoria Hall in Calcutta.

At present I am endeavouring to obtain information which might be of use to the Trustees in selecting a marble or other stones for the erection of the building.

In paragraph 5 of your letter you intimate the cost of the various rates charged by the Railways over which the stone would be brought. In addition to these figures I would be obliged if you would be so good as to indicate the price of the stone landed in Calcutta.

The sample has been duly received, and it might be useful if you will send another of similar size with one side polished.

I presume if it is decided to build the Memorial of this stone, that there would be ample quantity of marble of the quality as per sample. Any further information which you consider would be useful to the Trustees with regard to marble or any other suitable stone will be gladly received.

No. 7.

Dated 18th April 1903.

From—W. A. DRING, Esq.,

To—SIR W. LAWRENCE, K.C.I.E.

With reference to the very low rates quoted by us for the carriage of Makrana marble for the Victoria Memorial, acknowledged in yours of the 14th February 1902, can you kindly say whether it is time for us to move further in the matter, and with whom we should communicate?

(Charge from Makrana to Howrah Rs. 19-12 per ton, *plus* handling.)

No. 8.

Dated Camp Jaipur, Saturday, the 2nd May 1903.

From—W. C. G. RENTON, Esq., Sikar, Rajputana,

To—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial.

I have just received at Jaipur your most esteemed and valued No. 2682, dated the 15th April 1903, for which please accept my very best thanks.

2. On an invitation of the United Provinces Queen Victoria Memorial Committee I had been to Lucknow to arrange the building there in Makrana marble. The entire work has been entrusted to me to finish it as quick as I can do it, hence the delay in the receipt of and my reply to your kind communication.

3. In reply to paragraph 2 of your letter my opinion is that if the All-India Victoria Memorial is required to be durable, strong, and to retain its permanent beauty when finished for ages to come the structure must be built of Makrana marble entirely or at least all the outside part of it. There is no other marble in the world to compete with the Makrana marble in respect to qualities mentioned above.

4. The qualities of Italian, Grecian and marbles of other European and American countries are :—

(a) Non-lustrous and give very dull polish.

(b) Non-intense white and full of dull black veins.

- (c) They change colour and become disfigured and turn yellow under the influences of the weather.
- (d) Too soft a stone, hence making it totally unfit for a genius building purpose.
- (e) They are cheap but after expense and constant repairs and replacement of decayed, faded and disfigured pieces will be enormously expensive and perhaps the amount of repairs in a few years only will come up as much as the original cost.

5. There is none of the above annoying defects to be found in Makrana marble; it is exceedingly lustrous; gives a very brilliant polish; it is intense white; it does not change colour and become yellowish by age; and it is as hard as stone; as a proof see the Taj, Etmad-Dowla, Salem Chisti's tomb, all at Agra—these were built from Makrana marble, the marble was carried all the way to Agra by country tracts and rude village unmetalled roads, in the days when rail-roads were unknown.

(a) The sample I sent Mr. Cable and of which you are now in possession is from the same quarry from which the Taj was built. The ancient quarries were levelled to the ground. They have just been cleared at very heavy expense to keep up the increasing demand for Makrana marble just now in India especially for several Native Chiefs' palaces under construction.

6: In reply to paragraph 3 of your letter I give below the cost of Makrana marble per ton of about 27 maunds (twenty-seven maunds) landed at Calcutta:—

- (a) One ton of Makrana marble or about twelve cubic feet in pieces not exceeding ten maunds in weight inclusive of the exorbitant and very high Jodhpur State tax of Rs. 9-4-0 per cubic foot f. o. r. Makrana equals Rs. 111 *plus* Rs. 19-11-3 reduced railway freight, *vide* paragraph 5, my letter of 4th April 1903, to the address of Mr. Cable, makes a total of Rs. 130-11-3 or about Rs. 10-14-4 per cubic foot landed at Calcutta.
- (b) Exclusive of Jodhpur tax at Rs. 7 per cubic foot or Rs. 8-10-4 per cubic foot at Calcutta. A cubic foot weighs 2 maunds and 10 seers.

7. For pieces above 10 maunds in weight please calculate rates landed in Calcutta on the following existing scale of charges of Jodhpur State taxes on Makrana marble:—

From	1 seer	to	10 maunds	at	R 1-0	per maund.
„	10 maunds	to	12 „	at	„ 1-4	„
„	12 „	to	15 „	at	„ 1-8	„
„	15 „	to	17 „	at	„ 1-12	„
„	17 „	to	20 „	at	„ 2-0	„
„	20 „	to	22 „	at	„ 2-4	„
„	22 „	to	25 „	at	„ 2-8	„
„	25 „	to	27 „	at	„ 2-12	„
„	27 „	to	30 „	at	„ 3-0	„
„	30 „	to	32 „	at	„ 3-4	„
„	32 „	to	35 „	at	„ 3-8	„
„	35 „	to	37 „	at	„ 3-12	„
„	37 „	to	40 „	at	„ 4-0	„
„	40 „	to	50 „	at	„ 5-0	„
„	50 „	to	60 „	at	„ 6-0	„
„	60 „	to	70 „	at	„ 7-0	„
„	70 „	to	80 „	at	„ 8-0	„
„	80 „	to	90 „	at	„ 9-0	„
„	90 „	to	100 „	at	„ 10-0	„

From the above scale of charges it will be observed that if a piece of Makrana marble costs at the quarries only 8 annas, the Jodhpur State tax on it is from Re. 1 to Rs. 10, in accordance with the weight of *one piece*.

8. For the All-India Victoria Memorial at Calcutta I propose your addressing Colonel Jennings, Resident, Western States of Rajputana, Jodhpur, to reduce the Jodhpur State tax on Makrana marble intended for the Victoria Memorial Hall at Calcutta to *eight annas* or less, if possible, irrespective of *weight, length, breadth and dimension*, and I have every reason to believe Colonel Jennings will have the reduction made, specially as he has the full administrative powers just now of the Jodhpur State.

(b) The United Provinces Victoria Memorial Committee have also addressed Colonel Jennings on the subject, and I have been promised a copy of Colonel Jennings' reply and orders to the Jodhpur Darbar for my guidance.

9. *Paragraph 4 of your letter.*—The polished sample piece of Makrana marble required of the same size I sent you unpolished, I am sending you immediately by to-day's Railway parcel-paid; herewith please find Railway receipt of the parcel. The piece of marble has been very hurriedly polished here to-day so as not to miss the post.

10. *Paragraph 5 of your letter.*—Yes, I can supply unlimited quantity of Makrana marble to complete the construction of the Victoria Memorial at Calcutta.

(a) I might as well say that on receiving your definite reply and orders I shall stop receiving other small orders for the palaces of Native Chiefs, &c., and arrange to clear out and put in working order a few more ancient quarries for the supply of Makrana marble for the Memorial.

(b) As the Victoria Memorial will require a very large quantity, can you give me an idea of the probable number of cubic feet that will be required of rough unfinished and unpolished marble, also the measurement in length, breadth and dimension of the largest slabs, pillars, &c., to enable me to arrange to quarry the sizes?

11. I have just heard from a friend, but I cannot vouch the truth of its assertion that it has been decided within the past few days that the All-India Victoria Memorial Hall at Calcutta is to be built in marble from foreign countries.

(a) If such be the decision of the Trustees and Building Committee, it will be no small disappointment to the majority of subscribers to learn that the collected money was sent to foreign countries for inferior marble and the best marble in the world which India produces was rejected and the subscribed money was not kept in India. We all hope that the rumour is groundless and that the Trustees and Building Committee will see their way to use the best marble for the Royal Structure to enable it to retain its original lustre, beauty, &c., &c., to end of time.

Awaiting your further commands and which will always have my most careful and prompt attention.

I shall be in Jaipur till the end of this month; please address my letters to enable me to reply immediately—

c/o The Very Rev. FR. PAUL, O. M. C.,
Jaipur, Rajputana.

1. *Enclosure.*—Parcel R. R. N. $\frac{A}{6}$ 82957, dated 2nd May 1903, from Jaipur to Calcutta, weight $5\frac{1}{2}$ seers, freight paid Re. 1-9.

No. 9.

Dated 5th May 1903.

From—COLONEL SIR S. S. JACOB, K.C.I.E., Superintending Engineer, Public Works Department, Jaipur,
To—SIR W. LAWRENCE, K.C.I.E.

The only experience I have had with Makrana marble has been in making altars, pulpits, tomb-stones, fonts, &c., from time to time, by request.

The rates we have to pay here at Jaipur (see list A attached) make it very expensive ; and even to meet our small demands, the difficulties and delays I have experienced have been great ; and then, I have sometimes had to reject blocks on account of some flaw, which is only seen when the block is cut open.

However, as the Makrana quarries are situated in the Jodhpur State, I wrote to Home, the Manager of the Jodhpur-Bikaner Railway, to see what help or information he could give, and to-day received his reply, of which a copy is herewith enclosed.

I do not know of any other good marble in this part of India.

If the Viceroy has any doubt on the subject, or wishes particularly to use Indian marble, then I would suggest a request be sent through the Resident, Jodhpur to the Durbar, stating sizes of marble required, asking them to send all the marble they are able to supply from the Makrana quarries in any stated time—a sort of trial, to test the matter—and it will soon be seen what is the result, and whether it would be of any use to clear out the quarries and try to work them systematically.

[*Enclosures to the above letter.*]

Letter from W. HOME, Esq., Manager, Jodhpur-Bikaner Railway, dated Jodhpur, the 4th May 1903, regarding Makrana marble.

I have been making enquiries about Makrana marble.

The Durbar have a duty on it which is practically prohibitive and is as follows :—

For stones up to 10 maunds in weight each Re. 1-1-0 per maund.

For every additional $2\frac{1}{2}$ maunds weight per stone 4 annas extra per maund.

Thus, if a stone weighed half a ton the duty would be at the rate of Re. 1-9-0 per maund.

Sukhdeo Pershad tells me that they will reduce this duty by half in the case of marble for the Victoria Memorial ; this would bring the duty to Re. 0-8-6 per maund, or about Re. 1 per cubic foot.

I have enquired from two contractors here who do work at Makrana, and they say the cost of the best marble, in the rough, in railway wagons would be from Re. 1-8-0 to Rs. 2 per cubic foot.

The railway freight to Calcutta, according to the special rates promised by the different railways for marble for the Victoria Memorial, will be per ton :—

				Rs.	a.	p.
Jodhpur-Bikaner Railway	.	.	.	0	11	3
Rajputana-Malwa „	.	.	.	4	0	0
East Indian „	.	.	.	15	0	0
				<hr/>		
TOTAL	.	.	.	19	11	3

or, say, Re. 1-8-0 per cubic foot.

Therefore the total cost of stone up to 10 maunds in weight each would be in Calcutta, per cubic foot :—

				Rs.	a.	p.
Duty	.	.	.	1	0	0
Cost of stone	.	.	.	2	0	0
Freight	.	.	.	1	8	0
				<hr/>		
TOTAL	.	.	.	4	8	0

There is, however, another question.

The Makrana quarries have been unscientifically worked for ages, and are blocked up with accumulations of detritus; the strata dip almost perpendicularly into the ground, and the high class marble, which is found as a rule in thin seams, has now been worked out for a considerable depth below the surface, although marble of an inferior description is to be had cheaply in any quantity.

One of the two men I have consulted says you could only get about 500 cubic feet of the best marble per month—the other puts the amount at double this. I myself think a good deal could be got with proper arrangements.

A.

Rates of Makrana stones of Jaipur.

From 1 to 4 c. ft.	.	.	.	.	@ Rs. 6-4 per c. ft.
„ 4 „ 8 „	.	.	.	.	„ „ 10-7 „
„ 8 „ 11 „	.	.	.	.	„ „ 12 „
„ 11 „ 14 „	.	.	.	.	„ „ 13-8 „
„ 14 „ 17 „	.	.	.	.	„ „ 15 „
„ 17 „ 20 „	.	.	.	.	„ „ 16-8 „
„ 20 „ 23 „	.	.	.	.	„ „ 18 „
„ 23 „ 25 „	.	.	.	.	„ „ 19-8 „

No. 10.

No. 2761, dated Calcutta, 8th May 1903.

From—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial,

To—W. C. G. RENTON, Esq., Sikar, Rajputana.

I have the honour to acknowledge with thanks your letter, dated 2nd May 1903, contents of which are duly noted.

With reference to paragraph 9 of your letter, I am not at present in a position to state what quantity of marble or of the dimensions of blocks which will be required for the building of the proposed Hall.

So far any enquiries regarding materials have only been preliminary, and it is yet too early for the Trustees to decide definitely regarding their intentions.

No. 11.

Dated 22nd May 1903.

From—SIR BRADFORD LESLIE, K.C.I.E.,

To—SIR P. PLYFAIR, Kt., C.I.E.

* * * * *

I hope to send my replies in the course of a few days. Meantime I would observe that lime and stone, and possibly coal and other material for the Memorial, will have to be transported in large quantities and from long distances by the East Indian Railway. This line, as you know, is four-fifths owned by the State, and I should think the Company that works it would, as their contribution towards the Memorial, be pleased to carry all such material, as certified by the Architect *bona fide* for the construction of the Memorial, free of cost.

Or, if they are not minded to contribute towards the Memorial, they should at least carry all such material at the one-tenth pie per maund per mile rate which they charge for their own revenue stores; this rate is less than $\frac{1}{4}$ per ton mile.

To afford the Company the opportunity of being liberal, it would be better to apply to them first for carriage of material free of cost.

I should hope they would recognise the graciousness of being generous in such a case; but if they are not disposed to be liberal, then the Trustees should apply to the Government of India to intercede on their behalf with the East Indian Railway Board.

If specimens of material from all parts of India are to be incorporated in the structure, then it may be that Government of India will arrange for free transport by rail throughout India.

Possibly these matters have already been under the consideration of the Trustees.

No. 12.

Dated Ajmere, 23rd May 1903.

From—MESSRS. F. MARIA & Co.,

To—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial.

We beg to own receipt of your most esteemed and valued No. 2761, dated 8th May 1903, addressed to Mr. W. C. G. Renton, Sikar, Rajputana, for which please accept our thanks.

2. We shall be glad to know when the Trustees will decide about the construction of the Memorial.

3. If you have plan of the Memorial, we shall be glad to have a copy of the blue prints.

4. Colonel Jennings has greatly had the Jodhpur taxes reduced on Makrana marble intended for Lucknow Memorial which we are building, and we trust you have written to him to do the same for the Calcutta Victoria Memorial.

5. Awaiting your further commands and orders which will have our most careful attention.

No. 13.

No. 2818, dated Calcutta, 26th May 1903.

From—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial,

To—MESSRS. F. MARIA & Co., Ajmere.

I have the honour to acknowledge your letter, dated 23rd May 1903, intimating that Mr. W. C. G. Renton of Sikar, Rajputana, has taken over your firm, and that further communications regarding Makrana marble may be sent to your address.

Regarding the paragraphs 2, 3 and 4 of your letter, I regret that I am at present not in a position to supply you with any information.

[Enclosure to above letter.]

NOTICE.

I have taken over from 1st May 1903 the well-known firm of Messrs. F. Maria & Co., Builders and Marble and Stone Contractors, Ajmere, Rajputana. On account of the abandonment of the proposed line of Railway to Sikar, I have removed my business to Ajmere, and it will be carried on there under the name and style of F. Maria & Co. My constituents are therefore solicited to address, in future, their orders and business correspondence, intended for me at Sikar, to Messrs. F. Maria & Co., Ajmere, Rajputana, where they will

be attended to with promptitude and exactness as usual under my personal and immediate supervision.

W. C. G. RENTON,
Sikar, Rajputana.

AJMER;
Dated 15th May 1903.

No. 14.

Extract from para. 3 of the Minutes of the Meeting of the Trustees, dated 4th June 1903.

* * * * *

Sir William Emerson is of opinion that a large proportion of the marble required must come from Greece, but if a quantity can be obtained from the Makrana quarries of Rajputana, he would favour a contract being made, and he thought that it might be useful to use this marble for the domes and have them all of the same colour. He understood that it was very difficult to obtain marble in any quantity from Makrana, and he feared that unless the owners of the quarries were prepared to put down plant to win the stone, large supplies would not be forthcoming ; but as a concession to the national feeling he would be quite willing on his part to do what he could to make use of supplies. He also referred to the coloured marbles obtainable in India, and thought that, if His Excellency and the Trustees desired it, and funds were available, interior portions of the building might be decorated with coloured marbles or mosaics.

No. 15.

Extract from para. 3 of letter from SIR P. PLAYFAIR, KT., C.I.E., to SIR W. LAWRENCE, K.C.I.E., dated 10th June 1903.

* * * * *

Sir William Emerson would be prepared to make use of Makrana marble, if available in sufficient quantity, and he considers that owing to its purity and lustre, it would be suitable for the domes of the building and that it would be advisable to construct these of one marble.

* * * * *

No. 16.

Extract from letter from SIR W. EMERSON to SIR P. PLAYFAIR, KT., C.I.E., dated 23rd June 1903.

As to the Indian marble, I shall be most glad to find that it can be obtained from Markana at a price which will enable us to use it ; the prices already quoted are prohibitive. If the Secretary is taking the trouble to find out the prices of stones, apart from marble, I should think he is giving himself unnecessary trouble, as that will be a question for the contractors in their competition tenders.

No. 17.

Extract from para. 5 of the Minutes of the Meeting of the Trustees, dated 30th June 1903.

Sir William Emerson hoped by an early date to receive quotations of the cost of marble from Greece which, according to present indications, should not much exceed the cost of Portland stone, and he felt sure would be very much cheaper than the cost of marble obtainable from Makrana, and of equally good quality. With the further information given to him by the Trustees, he had again examined the cost of marble from Makrana, and was astonished to find the railway rates so prohibitive. He was also pleased to ascertain that the cost of brick-work in India was very much cheaper than in England.

No. 18.

Extract from the Minutes of the Meeting of the Trustees, dated 14th July 1903.

Sir William Emerson produced an analysis of Makrana marble, which was satisfactory, but did not prove the stone to be equal in quality for his requirements to the marble obtainable from Greece.

No. 19.

Dated 7th August 1903.

From—MESSRS F. MARIA & Co. (Late W. C. G. RENTON), Ajmer, Rajputana,

To—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial, Calcutta.

With reference to previous correspondence on the subject of Makrana marble required for the building of Queen Victoria Memorial at Calcutta, we most respectfully beg to inform you that our applications have been acceded to by the Jodhpur Durbar in the reduction of the excessive export duty on Makrana marble.

2. We have now the honour of quoting our best and lowest rates for Makrana marble, delivered railway freight paid, and free on the rails at Howrah Railway Station goods shed, at Rs. 5-9 (Rupees five and annas nine) per cubic foot.

We now hope the rate of Makrana marble will prove (more ?) favourable than the rates of European imported marbles in India,—which is soft and dull stone and unfit for genius structures required to stand for ages.

3. As we have taken the contract of building, and supplying to other builders in Makrana marble, several Queen Victoria Memorials in India, we have now greatly strengthened our staff at Makrana and one of our representatives now permanently resides at Makrana,—so we can now supply Makrana marble in *unlimited* quantity,—there is no fear of the quarries getting exhausted for another thousand years or so as is supposed by some,—from the time the Taj and other structures were being built in Makrana marble the quarries remain just as good now as they were in ancient times.

Trusting to be very kindly favoured with a reply and your orders for Makrana marble, and please consider us always to be at your commands and service.

No. 20.

No. 2966, dated Calcutta, 18th August 1903.

From—W. W. CUNNINGHAM, Esq., Secretary to the Trustees of the Victoria Memorial,

To—MESSRS. F. MARIA & Co., Ajmer.

I have the honour to acknowledge with thanks the receipt of your letter, dated 7th August, intimating that you are prepared to supply Makrana marble at the reduced price of Rs. 5-9 per cubic foot delivered at Howrah Station.

I will be glad to lay your offer before the Trustees for their consideration.

No. 21.

Extract from a letter from His Excellency the Viceroy to SIR W. EMERSON, dated Viceregal Lodge, Simla, 10th September 1903.

* * * * *

35. I assume that you have seen the correspondence that has been passing here in respect of Indian marbles. If you have not, I send you copies. It raises a question of supreme importance. Hitherto we have been proceeding upon two assumptions—

(1) that the bulk of the marble must be procured from Greece, because it could not be found in sufficient quantities in this country;

(2) that the Pentelic marble could be landed in Calcutta at a price far cheaper than any Indian marble, even supposing such to be forthcoming.

36. But there seems to be some ground for thinking that both these assumptions are erroneous. The enclosed correspondence will show you—

(a) that recent investigations indicate that there is still an unlimited supply of Makrana marble;

(b) that close to the banks of the Irrawaddy in Burma is an inexhaustible supply of a white marble, somewhat resembling alabaster.

Further, as regards cost, whereas you have reported in the Minutes of the Meeting of August 1st, that the Athenian marble will work out at about Rs. 16 per cubic foot when landed in Calcutta; it is now alleged that the Sagyin or Burmese marble could probably be delivered f. o. b. at Rangoon at Rs. 4 per cubic foot while the contractor for the Makrana marble actually speaks of delivering it, freight paid, at Howrah Station at Rs. 5-9 per cubic foot.

37. If these various statements are even approximately correct, it would appear that the whole situation may be radically changed, and that we may have to reconsider our plans as to procuring the marble. For, I imagine that no one will dispute these propositions—

(i) That it is from every point of view desirable to employ Indian marbles exclusively if we can, if not, to the largest extent possible.

(ii) That if the Makrana marble is still available, we have a material of which we know already that it is admirably suited to the Indian climate, since there have been built of it the finest series of buildings in Indian Continent, which have lasted intact for 300 years.

(iii) That there can be no similar certainty about the Athenian marble, which has never been tried in a country with a monsoon.

(iv) That *ceteris paribus* we are bound to buy in the cheapest market.

38. You already know the Makrana marble with its exquisite bluish veins. I will send off to you by the next mail one or two samples of the Burmese marble. It has a beautiful texture and takes a very high polish. All the Buddhas in days of the Burmese kings used to be made of it. It is also flecked with blue.

39. Of course one great difficulty in extracting large amounts of Indian marble, whether in Rajputana or Burma, will be the machinery and the workmen. We might have to import both. But I do not see why this would be insurmountable.

* * * * *

No. 22.

Dated 23rd September 1903.

From—SIR W. LAWRENCE, K.C.I.E.,

To—COLONEL SIR S. S. JACOB, K.C.I.E.,

The Viceroy desires me to forward you the enclosed papers relating to Makrana marble. Could you ascertain and let me know at your earliest convenience whether Messrs. Maria are substantial and trustworthy people who could undertake large contracts?

No. 23.

Extract paragraph 8 from a letter from His Excellency the Viceroy, to the Trustees, dated 25th September 1903 (circulated with Memo. of 25th September 1903).

* * * * *

Sir W. Emerson is very anxious to conclude an immediate agreement with the English Company for the Greek marble. The correspondence which you have seen will show that there is a reasonable hope of getting a great deal, possibly even the whole, of our marble from India, and if this is practicable, I do not think that we should get one cubic foot from abroad. In sequel

to the papers which you have seen, I may mention that I have (1) written to Sir S. Jacob in Rajputana to ask whether the reports about the Makrana marble are reliable, and whether the contractors are to be trusted; (2) asked the Lieutenant-Governor of Burma whether his Public Works Department could work the Sagyin marble, if required; (3) send samples of the latter to Sir W. Emerson for an analysis and report as to whether it will do (a) for the exterior or interior of a building, (b) for the climate of Calcutta.

* * * * *

No. 24.

Extract from letter from SIR W. EMERSON, dated 2nd October 1903.

35. As to the marble. Your Excellency may remember asking me to get specimens of various marbles tested. I sent on those of the Pentelic and Italian, but only some months ago obtained a specimen of Makrana marble. I enclose the test of this, from which it will be seen that it is distinctly inferior to Pentelic marble.

The sand-storms frequent in Greece are far more trying than any monsoon to the weathering capacity of marble. Rain, if even followed by frost, does not inflict any injury, and there is both rain and frost in Greece. I am aware that there is any quantity of marble in India; the difficulty is the getting it, or opening up of quarries. New quarries may cost unlimited capital in the opening up, to say nothing of the delay. In opening up quarries it is the universal experience that the first layers are without exception venty, discoloured, and in small pieces, and the cost of getting to the better material is always an unknown quantity, and takes a long time. This refers more particularly to Kurnool, Rangoon, Jubbulpore, etc.

At Makrana, no doubt, with some trouble and arrangement, large quantities could be guaranteed: the question is how quickly? Colonel Sir S. Jacob said the delay in supplying only one or two blocks was always very great. In Greece it is ready to hand, and, as I have said, is of better quality.

If the Rangoon marble partakes of the nature of alabaster, it would hardly do, as it would not weather well—alabaster being soft.

As regards cost, the approximate price, in the Minutes of August 1st, was 16 shillings, not 16 rupees, and was for Greek marble worked, delivered at Calcutta, and fixed in the building.

The Marmor Company then said they could not name a definite covering price, as without the quantities of the various classes of work, they were unable to tell what proportion the more expensive work bore to the plain work. I, therefore, lent them the drawings some time ago, with a sketch detail and they have now gone into the question, and will undertake it at 11/0 per foot cube f. o. b. at the Piræus. This is worked and moulded ready to fix in the building, or rough marble at 3/9 per foot cube, and facing at 1/9 per foot super. See copy of letter below.

As far as it is possible to calculate on the data supplied, the following is the approximate cost of the various Indian, Burma, and Greek marbles, delivered in the rough at Calcutta on the site, and worked and fixed in the building :—

R a. £ s. d.

A. SAGYIN MARBLE FROM BURMA—

See copy of letter from Under-Secretary to the Government of Burma, to the Secretary to the Trustees of the Victoria Memorial, Calcutta, dated Rangoon, 25th July 1903.

Rough blocks <i>could possibly</i> be delivered f. o. b. at			
Rangoon at per cubic foot of 160 lbs. ...	4	0	
To this must be added freight to Calcutta and Insurance, say ...	0	12	
Dock dues and cartage to site (same as Pentelic) ...	1	0	

5 12 0 7 8

B. MAKRANA MARBLE—

See copy of letter from W. C. G. Renton, Esq., Sikar, Rajputana, to W. W. Cunningham, Esq., Secretary to the Trustees Victoria Memorial, Calcutta, dated 2nd May 1903; also copy of letter, dated 7th August 1903, from Messrs. F. Maria & Co. (late W. G. C. Renton) to W. W. Cunningham, Esq.

Rough blocks delivered free on rails at Howrah Station					
good-sheds, per foot cube	.	.	.	.	5 9
Add cartage (4 miles), say	.	.	.	.	0 10
					<hr/>
					6 3 0 8 3
					<hr/>

C. KURNOOL MARBLE—

See copy of letter, dated 17th July 1903, from the Executive Engineer, Kurnool Division, Madras, P. W. Department, to the Secretary to the Trustees of the Victoria Memorial, Calcutta.

Cost of quarrying per cube yard, say	.	.	.	.	0 12
Cartage to Kurnool Road Station	.	.	.	.	9 0
					<hr/>
					9 12
1 yard cube at 12 ft. c. per ton, weighs 2½ tons	.	.	.	.	...
Railway carriage as for Makrana marble 2½ tons at Rs. 19-11-3	.	.	.	.	44 5
					<hr/>
Cost of 1 yard cube at Howrah Railway Station	.	.	.	.	54 1
					<hr/>
Cost of 1 ft. do. do., say	.	.	.	.	2 0
Add cartage, say	.	.	.	.	0 10
					<hr/>
					2 10 0 3 6
					<hr/>

The Kurnool marble seems out of the question; the information is too indefinite. I have, therefore, been unable to consider it seriously.

D. PENTELIC MARBLE—

Prices given by Marmor Company.

					£ s. d.
Rough blocks, any size, f. o. b. Piræus, per foot cube.					
Average 20 feet cube. Extra for statuary	.	.	.	.	0 3 9
Freight and Insurance (N. B.—This may be less), say	.	.	.	.	0 1 8
Dock dues and cartage to site, say	.	.	.	.	0 1 4
					<hr/>
					0 6 9
					<hr/>

The probable cost of supplying rough marble in blocks from Greece, and working it in Calcutta would be as follows:—

					£ s. d.
Rough blocks delivered on site in Calcutta as above	.	.	.	.	0 6 9
Waste, say, 20 per cent.	.	.	.	.	0 1 4
Working, moulding, and fixing as per prices quoted to me.					
Average covering price for all classes of work, say	.	.	.	.	0 7 0
					<hr/>
					0 15 1
					<hr/>

The probable cost, if worked in Greece and sent out ready for fixing:—

Cost f. o. b. at Piræus	.	.	.	.	0 11 0
Freight and Insurance (N. B.—This may be less), say	.	.	.	.	0 1 8
Dock dues and cartage to site, say	.	.	.	.	0 1 4
Fixing, say	.	.	.	.	0 1 0
					<hr/>
					0 15 0
					<hr/>

In regard to freight and insurance, the Marmor Company put it at 1/8 per foot cube, but they hope to be able to do it for less, and, if so, promise the benefit to the Trustees; but I suppose, if it were more, the Trustees would have to pay it.

In order to compare the prices of Indian and Burmese marbles with the prices of 15 shillings quoted for the Pentelic marble worked in Greece and fixed, it is necessary to add to the former.—

- (a) Waste;
 (b) Labour and working;
 (c) Fixing;
e.g.—

	<i>R. a. p.</i>
Makrana marble—	
Rough blocks	6 3 0
Waste, say 20 per cent	1 4 0
Labour, working and fixing, say	5 4 0
	<hr/>
Per foot cube	12 11 0 or 16/11 <i>d.</i>
	<hr/>

In comparing the cost of the Grecian marble sent out ready worked with the same marble sent out in blocks and worked in Calcutta, and with Makrana marble worked at Calcutta, it must be remembered that a sufficient allowance for waste, about 20%, must be made to the quantity of the two latter, so that, if 100,000* feet cube rough stone were required, this, when worked, would be reduced to about 80,000 cubic feet.

The comparative cost would, therefore, work out thus:—

		<i>£</i>
100,000 feet cube rough Pentelic marble delivered at Calcutta	@6/9	33,750
80,000 feet cube dressed ditto, labour, working and fixing	@7/0	28,000
Add to this sum the cost of steam plant and machinery for working the stone at Calcutta, say . . . . .	...	5,000
		<hr/>
TOTAL	...	66,750
		<hr/>
		<i>£</i>
80,000 feet cube of Pentelic marble dressed in Greece, sent out, and fixed in the building	@15/0	60,000
		<hr/>
100,000 feet cube rough Makrana marble delivered at Calcutta @ Rupees	6/3=8/3	41,250
80,000 feet cube dressed ditto, labour, working and fixing @ Rupees	5/4=7/0	28,000
Add to this the cost of steam plant and machinery for working the stone at Calcutta, say . . . . .	...	5,000
		<hr/>
TOTAL	...	74,250
		<hr/>

This is assuming that the quotation of Rs. 5-9 is for stones of all sizes, and not only for small stones not exceeding 10 maunds in weight as mentioned in the letter by Mr. Renton, dated 2nd May 1903. In F. Maria & Co's letter, dated 7th August 1903, this is not clear, and it is important, for many stones would average considerably more; and there is no quotation for 3" facing marble and bonders.

Also it is assuming that Rs. 5-4 is sufficient for working and fixing the stone in Calcutta.

From this it appears there would be considerable difference in the comparative cost of working Pentelic marble in Greece or Calcutta, and a still greater difference were Makrana marble used and worked in Calcutta. Were the Indian marbles much cheaper, then there remain the questions (a) how

* The quantity will considerably exceed 100,000 cubic feet.

speedily the large quantity required could be supplied, and (b) would the moulded work done in India, even if the contractors are bound to provide machinery, be as expeditiously and as well done with men working at unaccustomed machinery and material as in Greece with already well-organized workshops.

I would suggest that whatever course is pursued that at any rate Makrana marble be used for all the domes. This must be hand-work (not done by machinery), and will take time, and be a higher price. If worked in India, they would have plenty of time to prepare it; and all the domes would then be of the same colour, if there is any discernible difference between that and the Pentelic, were the latter used for the main building.

As to the lasting power of the Indian compared with the Greek marble, the Mogul buildings are some few hundred years old compared with the two thousand years of the Parthenon.

The Parthenon marble was taken from the south side of the mountain, which contains some iron pyrites, causing a warmer tone as it ages. The marble suggested to be used here would come from the north side of the mountain, and is quite free from iron pyrites.

Copy of Marmor &
Company's letter.

"I have gone very carefully into the prices of our marble since I received the plans which you were good enough to send me and without committing myself definitely, I think it will be possible for us to undertake the work at 11-0 per foot cube.

"The price of rough blocks was cut as low as possible, but subject to certain information, which I expect to have from Athens, I will endeavour to have the price reduced to 3/9 per cube foot.

"With regard to the price for 3" facing I would try to arrange that it does not exceed 1/9 per foot super.

"I ought to remark that our quarries are in full working order, and that we have a competent English Manager in charge of the Pentelican, who can carry out the whole work connected with the Calcutta Memorial in a thorough and satisfactory manner.

(Sd.) WILLIAM GUNN."

No. 25.

Dated 6th October 1903.

From—COLONEL SIR S. S. JACOB, K.C.I.E.,

To—SIR W. LAWRENCE, K.C.I.E.

On getting your letter dated 23rd September, asking for information about Messrs Maria & Co., in connection with Makrana marble, I have made enquiries, but beyond the fact that someone of that name has written to the Jodhpur Durbar, and to Mr. Home, the Manager of the Railway, for some concessions, no one seems to know who they are, or anything about them. I ordered a native to go to the quarries and make enquiries quietly, a few days ago; but I have not seen him since. I intended waiting until he had returned before writing to you; but I am going away for eight days, and I did not wish to delay so long.

I am very doubtful (if such a firm exists) whether they would be able to undertake any contract, and would certainly not give money, or pay anything in advance to them. There could be no harm in testing them with a trial order, and only paying for what is actually delivered—or of ascertaining how they are working for Lucknow—if it is true that they have a contract for the Victoria Memorial there.

No. 26.

Extract from the Minutes of the Meeting of the Trustees, dated 10th October 1903.

The Trustees considered what measures should be adopted to obtain further information with regard to the supplies of Indian marble, building materials, etc., as desired by Sir Patrick Playfair for Sir William Emerson.

In connection with this item, the Trustees perused the following note by the Secretary :—

“ Sir Patrick Playfair on behalf of Sir William Emerson has communicated with the Secretary requesting him to make enquiries regarding Indian marble, building materials, etc.

“ Mr. Holland, the Director of Geological Survey, has kindly undertaken to bring together as complete a collection as possible of the rocks likely to be of interest to the Trustees, but on the 9th of July last it was stated that it would be some time before the complete collection of specimens would be available in Calcutta, and up to date they have not yet been received. With regard to other building materials the Secretary has been in communication with Messrs. Burn & Co., Messrs. Gillanders, Arbuthnot & Co., Messrs. Balmer, Lawrie & Co., and the Superintending Engineer of the Central Circle, but owing to the lack of definite information from home as to what is likely to be required, the Secretary has only been in a position to make indefinite enquiries, and it appears to be probable that more satisfactory information will not be forthcoming until the Trustees call for tenders for the materials required. In this connection, the following is an extract from a letter received from Sir Patrick Playfair, dated 25th August 1903 :—

‘ I am, however, without any further information from you with regard to building materials, and I have again to repeat that Sir William Emerson and the Trustees in England have had to rely wholly upon information obtained here from gentlemen of Indian experience. Nor have we received any information from you with regard to the supplies of marble likely to be available in India. Sir William Emerson has, therefore, in correspondence with Mr. Eggar, suggested that provision should be made in the contract with the Marmor Company or other marble supplier for the quantity of marble required for the domes of the building. Sir William Emerson had previously suggested that if pure white marble were obtainable in India he would be prepared to meet the sentimental feeling of some of the subscribers and endeavour to make use of it for the domes.’ ”

The following is an extract from a letter, dated 7th August 1903 :—

“ As no information has arrived with regard to supplies of marble in India, it is assumed that the enquiries you undertook to make have proved to be fruitless, and the Trustees and the Architect have therefore been in communication with owners of quarries in Greece and Italy with regard to supplies of coloured marble for interior decorations as well as for white marble for the exterior portion of the building.

“ Before importing foreign marble, etc., it is advisable to acquire more and accurate information with regard to the possible supplies obtainable in India, and in doing so, it might be desirable to consult some individual who possesses a technical knowledge of these matters, and not rely upon the imperfect information which it is possible for a Secretary to obtain.”

In this connection the Trustees also considered paragraph 8 of His Excellency the Viceroy's letter, dated the 25th September 1903, and noted (1) that His Excellency is in communication with Sir Swinton Jacob, Rajputana, enquiring whether the reports on the Makrana marble are reliable, and whether the contractors are to be trusted ; (2) that His Excellency has asked the Lieutenant Governor of Burma whether his Public Works Department could work the Sagyin marble, if required.

The Trustees were in entire accord with the view expressed by His Excellency that as far as possible, only Indian or Burmese marble should be used.

It was then resolved that in the meantime the Secretary should await the result of the enquiries instituted by His Excellency, and that until this matter is settled, no contract should be entered into with any firm for European marble.

No. 27.

Extract from letter from HIS EXCELLENCY THE VICEROY to SIR W. EMERSON, dated 5th November 1903.

Sir S. Jacob is making enquiries about the Makrana marble. It is not certain that Messrs. Maria (the contractors) are to be implicitly relied upon.

There is no doubt that we can get as much of the Burmese Sagyin marble as we desire, but I have not yet heard from you as to the analysis of this. No doubt you are aware that there is the strongest feeling in India in favour of employing exclusively Indian marbles, if this be possible, instead of going to Greece, and we must defer to this feeling, which is quite legitimate, if we can.

No. 28.

Extract from letter from SIR W. EMERSON, dated 27th November 1903.

As to the price of this Sagyin marble, in my former letter, dated 2nd October, on the information then to hand, we calculated it at about Rs. 4-12 per cubic foot. The price now named in copy of the letter handed to me by Sir Patrick Playfair signed "Morris Jacob" from Rangoon, and dated 5th October, is Rs. 6-8 at Calcutta per cubic foot. This with Re. 1 added for dock dues and cartage to site, would bring it up to Rs. 7-8, or 9s. 4d., per cubic foot in the rough, unworked; or 1s. 1d. more than Makrana marble; or 2s. 7d. per foot more than Pentelic marble. So that if, as I pointed out in my former letter, the cost of Makrana marble would exceed that of Pentelic on a quantity of say 100,000 cubic feet, by £14,000, the Rangoon marble would be considerably more. There would probably be over 200,000 cubic feet of marble in the building. This would mean a cost of from £28,000 to £40,000 more if Makrana or Rangoon marble were used than if Pentelic marble were used, and worked in Greece. It might even be considerably more than that, because we have no definite knowledge as to what price contractors in Calcutta would require for putting up steam plant, and working the rough marble on the site.

No. 29.

Extract from the Minutes of the Meeting of the Trustees, dated 15th January 1904.

The President brought up the subject of marble required for the building of the Hall, and expressed himself very strongly as being in favour of using Indian material in preference to importing foreign stone. His Excellency and the other Trustees were of the opinion, however, that they might be obliged to use a considerable quantity of Pentelic marble, as there would probably be much difficulty experienced in making deliveries of the total quantity of about 200,000 cubic feet required.

At the suggestion of His Excellency and with the object of obtaining fuller information about Makrana marble, it was resolved that Mr. Sevenoaks should make an immediate visit to the quarries and make full enquiries on the subject. The advisability of visiting the Mandalay District was also considered with a view to obtaining further information regarding the Sagyin marble, but it was decided in the meantime that Mr. Sevenoaks should draft a letter for His Excellency the Viceroy, to be sent to His Honour the Lieutenant-Governor of Burma, requesting certain technical particulars of the working of the stone and the conveyance of same to Calcutta.

No. 30.

Telegram, dated 16th January 1904.

From—Private Secretary to Viceroy,

To—SIR S. JACOB.

Since you wrote to Lawrence on 6th October last about Messrs. Maria and Makrana marble, have you ascertained anything further? Trustees of Victoria Hall are about to despatch the Assistant Architect, Mr. Sevenoaks, to visit quarries personally, and make investigation. May he call upon you on way?

No. 31.

Telegram, dated Jhalrapatam, the 17th January 1904.

From—SIR S. JACOB,

To—The Private Secretary to the Viceroy.

Regarding Makrana marble have been unable to ascertain anything definite. Personal investigation by Assistant Architect the best course to

adopt. Am now engaged on irrigation work in wilds of Rajputana. Do not expect to return to Jaipur until March.

No. 32.

Extract from Communiqué, dated 17th January 1904.

Careful enquiries have been proceeding for some time past in to the quality and suitability of the marbles that are procurable in India. Difficulties of cost and transport, and the inadequacy both of skilled labour and machinery, render the use of the majority of these on any large scale prohibitive. But Mr. Sevenoaks, the Assistant Architect, is about to make a detailed inspection of the famous quarries of Makrana in Jodhpur; while a similar examination is being made of the Sagyin quarries near Mandalay in Upper Burma. The Trustees are anxious to employ Indian material to the largest extent available, though they are unlikely to be able to obtain the enormous amount of marble that will be required, amounting to 200,000 cubic feet, entirely within the country.

No. 33.

Dated 18th January 1904.

From—J. O. MILLER, Esq., C.S.I., Private Secretary to His Excellency the Viceroy,
To—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta.

The Viceroy has ascertained from Sir S. Jacob that he is not at Jaipur and that he has failed to ascertain anything about Messrs. Maria, the would-be Contractors of Ajmer. It is, therefore, desirable that you should proceed at once to Ajmer and should endeavour to ascertain who and what Messrs. Maria are, and whether they are a *bona fide* and reliable firm. If you require any assistance there you may show this letter to the Commissioner and invoke his aid. If Messrs. Maria turn out to be trustworthy persons, you might take one of their people with you to the quarries. You should then proceed to Jodhpur and should report yourself to Colonel Jennings, Resident at that place, to whom a telegram has been sent asking him to afford you every facility for visiting the Makrana or other quarries from which the marble is procured. While in Ajmer you should make enquiries as to the position of the native firms of builders there and their method of dealing with marbles. The Viceroy believes that all considerable work in marble in North India is undertaken by them, and they must know a good deal about the quarries, excavation, transport and cost.

You should start without delay.

No. 34.

No. 39—39 F., dated the 19th January 1904.

From—R. L. SEVENOAKS, Superintending Architect, Victoria Memorial Hall, Calcutta,
To—J. O. MILLER, Esq., C.S.I., Private Secretary to the Viceroy.

In reply to your letter of the 18th instant, I am arranging to leave for Ajmer to-night.

I consider it will take from ten to twelve days to gather the information required.

No. 35.

Dated Kishengarh, the 26th January 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta,

To—The British Resident, Jodhpur.

I arrived at Makrana on the 25th instant and duly inspected the quarries. The marble, I find, varies considerably, but it is quite possible a stone of uniformity could be secured.

I obtained some rates for the working and delivery of the stone to Howrah from local contractors. I enclose a copy of these, together with those given me by the Dewan when in Jodhpur. You will notice there is a considerable difference in the two rates. I am told, however, that these prices could be greatly reduced by calling for tenders.

An agent from the Mysore State, at present in Makrana, has arranged an all-round rate for blocks ranging from 1 cubic foot to 10 cubic feet, at the rate of Rs. 2-8 per cubic foot. The Dewan suggested that it would be more satisfactory to get the marble through the State, who would undertake to employ a contractor to supply the material. In this way the work would be carried out under the direct supervision of the officials. This arrangement, I consider, would be more satisfactory than employing an outside agent.

I would, therefore, feel obliged if you would kindly inform me at what rates the Jodhpur State would undertake to supply marble in rough blocks and also dressed, for the Victoria Hall, Calcutta, and if there would be any concession as to freight on the Jodhpur-Bikaner Railway.

Regarding yellow marble from Jaisalmer, the State Overseer (who was in Jodhpur on Sunday) quoted a rate of Rs. 4 for slabs cut to sizes of 4'0" x 3" x 3'0", which included the State duty of annas 12.

Would the duty and freight in this case also be reduced ?

I hope to be in Calcutta by Saturday next. A letter addressed to the Royal Exchange Buildings will find me.

No. 36.

Report by Mr. R. L. SEVENOAKS, Superintending Architect, Victoria Memorial Hall, of his visit to the marble quarries in Northern India.

A meeting of the Trustees of the Victoria Memorial Fund was held in the Council Chamber at Government House, Calcutta, on the 15th January 1904, His Excellency the Viceroy presiding, and, *inter alia*, quotations regarding the local supply of marble and the entertainment of contracts for the supply of the same were discussed, and it was decided that the Superintending Architect should visit the quarries in the Native States of Ajmer, Jodhpur and other places as soon as possible.

Under instructions contained in a letter from His Excellency's Private Secretary dated 18th January 1904 I left Calcutta on the 19th and arrived at Ajmer on the 22nd January.

Maria & Co., Contractors.

The little information I could gather regarding the status or stability of the firm carrying on business as marble contractors in the name of Maria & Co. was not very satisfactory. The firm was hardly known in Ajmer and they had no recognised or regular place of business there. However, with some difficulty I traced that they had a representative at Ajmer, a Mr. Lowe, and I found his office in a room of a small printing press. This gentleman informed me that a Mr. C. F. Renton represented the firm of Maria & Co., and their proper place of business was in Huzmuthgunge, Lucknow. I could not get much information about Mr. Renton, except that he was recognised more as a travelling agent and was ready to accommodate persons in any kind of contract work or take up agency business.

I went so far as to seek an interview with the Chief Engineer of the Rajputana-Malwa Railway and neither he nor his staff knew Mr. Renton or his firm. The Dewan at Kishengarh informed me that Maria & Co. had approached him for a concession to work certain quarries, and he implied that the concession was not granted as it was not desirable to have dealings with the firm.

However, during my visit to Makrana I learnt that Maria & Co. had obtained the contract for the supply of marble for the Lucknow Victoria Memorial and they had sublet their contract. I should have liked to have verified this last information but Sir Swinton Jacob was away from Lucknow.

A reference will be made to him on his return at the end of this month. In my opinion I do not consider Maria & Co. a desirable firm to negotiate with at present.

Ajmer native contractors.

With the assistance of the Dewan of Kishengarh I obtained the names of certain well-to-do native firms who take up building contracts. They were willing to undertake contracts for the supply of marble from the Makrana quarries, but I failed to come to any definite understanding with them as they were not prepared to commit themselves by quoting rates for quarrying, cutting, transport, etc., they wished first to enquire about local labour and the rates and they would let me know.

Ajmer quarries.

The cornices and pilastres of the Rajputana-Malwa Railway office were, I noticed, constructed of a white marble obtained from a quarry about 7 miles south-west of Ajmer known as Jammonchokie. As this quarry was only three-quarters of a mile due west from the line, I visited it. It is somewhat elevated, about 20 feet above the surrounding country and had apparently not been disturbed for some years, perhaps not since the railway office was constructed 15 years ago. The depth was about 15 feet and the surface indications did not show the stone to be of the same quality as that used in the railway office, but it was difficult for me to judge precisely seeing it after such a long exposure, and in the crude rocky state. The quality below the surface would soon prove this and the only difficulty is the means of transport. The railway company, of course, had a siding when their office was under construction and this has been removed. To construct another one would, I roughly estimate, cost about Rs. 9,000 a mile; this marble could, however, I am of opinion, be carted to the nearest railway station, Halundi, a distance of about 2 miles. To avoid the risk of splitting, the slabs would have to be cut to 3" thickness, not less.

Jodhpur State.

I interviewed both Colonel Jennings and the Dewan Pundit Sukdeo Pershad, C.I.E., at Jodhpur, the latter gave me some very valuable information regarding the working and cost of Makrana marble. I ascertained that the quarries could be worked with some 300 to 400 skilled men, who turn out quite elaborate and artistic work. These men live near the quarries. A duty of 8 annas per maund is levied by the State on the outturn finished, but this could be reduced to 4 annas per cubic foot (160 lbs.) for work connected with the Memorial.

Makrana quarries—Jodhpur.

I visited the Makrana quarries which are about 120 miles by rail from Jodhpur. The Jodhpur Land Revenue Officer and the Treasurer were good enough to accompany me; the quarries are about 6 miles long and at an elevation of about 60 feet above the surrounding plain, running north to south. I found work going on in five of the quarries and these were not more than a mile from the Makrana Railway Station. The north portion is named "Jhoonpa" and the south "Kala Dunjee," the country surrounding is mostly sand. The better stone is "Jhoonpa" and the depth of the working is 120 feet and the width 40 feet.

White marble.

There appeared to be a good variety of white marble procurable, but the method of working and selecting by uniformity of cutting with the grain is not all that could be desired. I felt convinced that if capital was invested in this direction in the way of introducing modern machinery and plant for cutting and dressing as well as raising, the result might be a complete success. Some of the samples I saw were excellent and quite equal to statuary marble, but the want of proper selection and uniformity in cutting was everywhere conspicuous.

Speaking geologically there are formations of clay and rock in Jhoonpa, and bands of white marble run through them varying in thickness from 1 foot

to 3 feet, but as the dead whiteness is not continuous and runs into tints of blue and green at the edges, blocks of 2 feet thickness only could be taken from the heart, which means cost of quarrying an enormous amount of waste.

In the "Kala Dunjee" quarry the marble appeared to be somewhat inferior, but there is no clay or rock to interfere, so that blocks or slabs to any movable size can be cut.

Pink marble.

Further south of "Kala Dunjee," really a continuation or spur of the quarry, is found a pink marble and it is not quarried to any depth, the deepest part being 20 feet, but I observed the marble improves at a greater depth.

Black marble.

There are here and there long streaks of black marble varying in thickness from 6 inches to 4 feet and from this indication it did not appear to be anywhere plentiful in bulk. It is not a jet black.

Labour and working.

These quarries are worked by local contractors and it seems astonishing why some modern method, even in the way of tackle for moving and raising, is not introduced. It is all manual labour and the blocks are levered and slid about till they reach the surface, and at this rate of progress I was not surprised to learn that only three or four blocks were brought to the surface in a day. There is a good opening for a marble contractor with capital, and if worked from the proper bed, with machinery and appliances, the deliveries might be made to meet the demand for the Memorial. But if this first outlay were added to the cost of the Memorial it might mean an enormous sum. This white marble, I consider, is of a very superior kind, and I am sure with the assistance and supervision of some important personage in the Jodhpur State, an experienced and qualified contractor could be entertained, but such an undertaking would have to be supported in the first place by an order sufficient to cover the initial cost. In consultation with the Dewan, I obtained certain rates (attached for reference), but as there is a difference compared with those quoted by local contractors, I drew the attention of the British Resident to it, and suggested that the Jodhpur State call for tenders in order to arrive at some definite figures. I think if a contract of this kind through the Jodhpur State is feasible at favourable rates, it might be satisfactory, and save friction and expense.

Yellow marble—Jaisalmer.

I ascertained that yellow marble is obtainable from a quarry about a mile from Jaisalmer in the Marwar State, which place is 96 miles from Barmer on the Jodhpur-Bikaner Railway. This State is under Jodhpur, and the Dewan is Luchmidass Ranjee. The Overseer Ladsao Sing was in Jodhpur during my visit and I learnt from him that this yellow marble cut and dressed ready for polishing, can be supplied at Rs. 4 per cubic foot inclusive of the State duty of 12 annas. I estimate with the cost and transport to the railway station, the marble could not be delivered at Howrah under Rs. 8 per cubic foot. It is, however, possible that the Marwar State could arrange and fix more favourable rates. I referred to this in a letter I addressed to the British Resident, Jodhpur.

Black marble—Jaisalmer.

I was informed a black marble was also procurable at Jaisalmer, but I failed to get full particulars regarding it; it is called "Ujoba."

Green marble (Jodhpur State).

A sample of greenish tinted marble called "Sujaya" was shewn to me as being procurable from certain quarries at Marwani. I could not fix on the exact locality, but I was informed the quarries were situated about 17 miles from the nearest railway station about 3 stations to the south of Marwar Junction. These quarries, however, are not being worked.

Kishengarh.

My visit to this place, where I arrived on the 26th January, was satisfactory and the Dewan gave me every assistance to visit the quarries.

Gogarra quarry.

I visited Gogarra quarry which is about 14 miles north-west of Kishengarh and not elevated. There are two quarries which appeared to me to have been very little disturbed; the marble is a mottled white or greyish. The excavation goes down a very few feet, but slabs 8 to 12 feet long up to a thickness of 2 feet could be cut from this quarry.

Jhati quarries.

Some few miles further south near the Sambhar Salt Lakes are the Jhati quarries which are slightly elevated, and the nearest railway station is Nanan, about 5 miles off. The marble I found was similar to Gogarra, and excavation had been made to the depth of 18 feet.

Tonhira quarries.

In the Tonhira quarries south to Jhati, both pink and white marble are procurable in abundance. These quarries had been opened up. The depth was 25 feet and the length fully 70 feet, width about 30 feet. The nearest railway station is Kishengarh, 3 miles distant.

Kishengarh State.

I am of opinion that marble can be procured anywhere and everywhere in the Kishengarh country, and it is not necessary to go miles away from the railway line. The opening of a quarry in close proximity to the line is advisable, as any cart transport across a surface of deep sand would be laden with difficulties. The cost of time to open such a quarry would have to be carefully considered, but the Dewan informed me that he is quite prepared to lay out capital to provide machinery and plant for quarrying and lifting, &c., if there is some certainty of a large supply being required. If worked to a greater depth, it might perhaps equal the Makrana in quality.

I have in my possession samples of all the marbles from the several quarries I visited and the rates for the same (inclusive of the cost of the marble delivered at Howrah are given in the list attached.

MAKRANA MARBLE.

Rates obtained from Local Contractors.

ROUGH BLOCKS.

No.	Sizes of blocks.	Quantity.	Rate.	Amount.	Freight to Howrah including State duty.	
			<i>Rs.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>£ s. d.</i>
1	2'-0" x 1'-0" x 0'-6"	1 C. F.	2 per C.F.	2 0 0	4 1 7	0 5 4½
2	6'-0" x 2'-0" x 0'-9"	9 C. F.	2 „ „	18 0 0	4 1 7	0 5 4½
3	6'-0" x 2'-0" x 0'-4"	4 C. F.	2-12 „ „	11 0 0	4 13 7	0 6 5½
4	6'-0" x 3'-0" x 0'-2"	3 C. F.	6 „ „	18 0 0	8 1 7	0 10 9½
5	4'-0" x 4'-0" x 0'-9"	12 C. F.	3-6 „ „	37 8 0	5 7 7	0 7 3½
6	8'-0" x 2'-0" x 2'-0"	32 C. F.	4-8 „ „	144 0 0	6 9 7	0 8 9½
The above rates include loading at quarries cartage to station and loading into wagons.						
<i>Dressed marble or face work.</i>						
	4'-0" x 12' x 3" (one face)	...	1-4 per S.F.	...	...	0 1 8
	4'-0" x 15' x 3" („ „)	...	1-6 „ „	...	...	0 1 10

NOTE —Special freight will have to be arranged for polished, packed and dressed stone, which have been promised by the East Indian Railway.
No rate obtained for carved work, as contractors say they must know the nature of work before quoting.

MAKRANA MARBLE.

Rates given by Jodhpur State.

			<i>Rs. a. p.</i>	<i>£ s. d.</i>
Marble cut in rough blocks (any size) per c. ft.	...	...	2 0 0	
Cartage from quarries to station	...	...	0 3 0	
State duty	...	...	0 4 0	
Freight from Makrana Station to Howrah	...	...	2 3 4	
	per c. ft.		4 10 4	0 6 2½
Worked stone (plain dressed, any size) per c. ft.	...	...	3 5 0	
Cartage from quarries to station	...	...	0 3 0	
State duty	...	...	0 4 0	
* Freight, packed (to Howrah)	...	...	3 14 3	
	per c. ft.		7 10 3	0 10 2½
Carved work per c. ft.	...	...	7 0 0	
Cartage from quarries to station	...	...	0 3 0	
State duty	...	...	0 4 0	
* Freight, packed	...	...	4 1 6	
	per c. ft.		11 8 6†	0 15 4½

* It is not known how this rate has been obtained.

† The above rate is also for slabs averaging 4' 0" × 12" to 15" × 3".

KISHENGARH MARBLE.

Rates given by the Dewan for white and pink marble.

			<i>Rs. a. p.</i>	
In rough dressed blocks from 1 to 10 c. ft.	...	...	1 10 0	
State duty	...	...	0 2 0	
Cartage from quarry to Kishengrah State	...	...	0 2 0	
‡ Freight from Kishengarh to Howrah	...	...	1 5 9	
Handling at Agra	...	...	0 2 0	
Cartage from Howrah to site (including two handlings)	...	...	0 3 0	
			3 8 9	0 4 8¾

‡ Provided same rate could be obtained as from Kuchaman Road to Agra.

§ *Dressed marble for face work.*

Blocks of 4' 0" × 12" to 15" × 3"	...	...	3 4 0	
State duty	...	...	0 4 0	
Cartage	...	...	0 2 0	
			3 10 0	0 4 10

§ Special freight will have to be arranged for dressed stones.

Sinodia black marble.

1 foot square polished (including State duty)	...	...	0 14 0	
Cartage	...	...	0 1 0	
			0 15 0	0 1 3

NOTE—Special rates will have to be arranged for polished and packed stones.

FREIGHTS.

Special rates for marble.

	Rough blocks, per ton.			Dressed blocks, per ton.			Polished, per ton.		
	<i>Rs.</i>	<i>a.</i>	<i>p.</i>	<i>Rs.</i>	<i>a.</i>	<i>p.</i>	<i>Rs.</i>	<i>a.</i>	<i>p.</i>
<i>East Indian Railway.</i> From Agra to Howrah (841 miles) in full wagon loads at owner's risk ...	15	0	0						
<i>J. B. Railway.</i> From Makrana to Kuchaman Road (18 miles) in full wagon loads at owner's risk	0	11	4						
<i>R. M. Railway.</i> From Kuchaman Road to Agra (185 miles) in full wagon loads at owner's risk	4	0	0						
Total per ton which=14 c. ft.	19	11	4	=£ 1	6	3½			

The E. I. Railway have promised to supply special rates for dressed and polished (packed) marble. The matter will have to be referred to the Agent.

No. 37.

No. ⁹²⁴~~356~~, dated Jodhpur, 12th February 1904.

From—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Calcutta.

On receipt of your letter, dated Kishengarh, the 26th January 1904, regarding Makrana and Jaisalmer marble, I addressed both the Marwar and Jaisalmer Durbars on the subject, and asked that, in fixing the rates at which they are prepared to supply the marble, they should consider not only the object for which it is required, but also the fact that if it can be obtained at a reasonable price, very large quantities of the stone will probably be taken; and the Durbars will profit not only directly but indirectly from the large amount of money coming into their States to pay workmen, etc.

2. I have the honour to enclose a copy of a letter received from the Marwar Durbars together with its enclosure—a comparative statement of rates—which speak for themselves.

3. I have not heard from the Jaisalmer Durbar yet. On receipt of their reply I shall do myself the honour to send you a copy.

[Enclosure to the above letter.]

No. 322, dated 8th February 1904.

From—The MEHKMA KHAS, Raj Marwara,

To—The Resident, Western Rajputana States.

In reply to your letter No. 617, dated 30th January 1904, forwarding an enclosure received from Mr. R. L. Sevenoaks, I have the honour to submit herewith a comparative statement which will show that the Durbar, while giving the rates to Mr. Sevenoaks for the rough and dressed marble, had the points referred to in paragraph 2 of your letter under reply in their view.

2. You will be pleased to observe that the Durbar has reduced its duty by 80 per cent. and its rates compare favourably with those given by different contractors.

3. The railway freight is a matter on which the Durbar has no control except on such portion of it as lies within its territory.

4. With a view to facilitate the lifting and transport of the quarried stone the Durbar has determined to lay out a sum of Rs. 12,000 in putting on a siding from the railway station to the quarries, and to place at the disposal of the quarrymen, cranes, jackscrews and sawing machines, whereby it is expected that the rates would be further reduced as noted in the accompanying statement.

5. In conclusion I beg to add that, if Mr. Sevenoaks or the Supreme Government be kind enough to make any practical and useful suggestions enabling the Durbar to compete with Italian or other marble in the market, the Durbar will thankfully give them consideration.

Comparative schedule of rates for Makrana marble required for the Victoria Memorial at Calcutta.

Rates tendered by various contractors at Makrana including Maya Ram, the agent of English firm.	Rates arranged by the Agent of Mysore State for purchase of marble.	Rates suggested by the Dewan of Jodhpur State.	REMARKS.
<i>Rough blocks from 1 to 20 cubi feet.</i>	<i>Rough blocks from 1 to 10 cubic feet.</i>	<i>Rough blocks from 1 to 20 cubic feet.</i>	
Average of the 6 items as tendered for various sizes Rs. 2+2+2-12 20 10 + 6-0 + 3-6 + 4 8 = <u>6</u> 3 7-0 per c. ft. of all sizes of 1st and 2nd quality.	For any size of 1st and 2nd quality, the rate per cubic foot is Rs 2-8-0 while from 1 to 20 c. ft.	For any size of 1st quality the rate per cubic foot is—	Jodhpur State rates are much cheaper than those of the contractors and Mysore State, and at the same time the marble is of the best quality and the Mysore rate is for 1 to 10 c. ft. only, while that of Jodhpur State for 1 to 20 c. ft.
<i>Rs. a. p.</i> 3 7 0	<i>Rs. a. p.</i> 2 12 0	<i>Rs. a. p.</i> 2 3 0	
Add State duty @ Rs. 0-9-3 per maund as usual 1 c. ft. weight 2 maunds 7 seers English, therefore the duty on a c. ft. 1 4 0	1 4 0	0 4 0	The duty is already reduced by the State for this special purpose from Rs. 1-4-0 to 0-4-0 a c. ft.
<u>4 11 0</u>	<u>4 0 0</u>	<u>2 7 0</u>	

As regards railway freight from Makrana to Howrah, arrangements may be made with the railway authorities concerned for concession.

		State further reduces the rate of Rs. 2-3-0 to Rs. 1-12-0 per c. ft. <i>plus</i> duty As. 4 for any size from 1 to 10 c. ft. and from 1 to 20 c. ft. of any size from Rs. 2-3-0 to Rs. 2 + duty As. 4.	
<i>Dressed slabs 1 face per s. ft.</i>	<i>Dressed slabs 1 face per s. ft.</i>	<i>Dressed slabs 1 face per s. ft.</i>	
Average per s. ft. 1-4-0 + 1-6-0 = 2-10-0 ÷ 2 = <i>Rs. a. p.</i> 1 5 0 State duty per s. ft. 0 5 0 <u>1 10 0</u>	<i>NIL.</i>	<i>Rs. a. p.</i> Per s. ft. 3 inches thick 0 14 0 State duty . . . 0 1 0 <u>0 15 0</u>	
		Further proposed reduction for this work As. 9 per s. ft. <i>plus</i> duty As. 1 = 0-10-0 per s. ft.	

NOTE.—Rates for ornamental work or carved may be proposed on receipt of specimens.

S. M. MEHKMA KHAS,
Raj Marwar.

Memorandum by SIR W. EMERSON, dated 24th February 1904 (enclosed in letter from SIR W. EMERSON to the Private Secretary to the Viceroy, dated 2nd March 1904).

In a letter to His Excellency, dated October 2nd, 1903, I compared the costs of India marble and Greek marble, showing from the quotations then available, that the difference between using Indian marble and working it in Calcutta, or using Pentelic marble worked in Greece and sent out to Calcutta ready for fixing, would be some £14,000 more for eighty thousand cubic feet of Indian than for Greek marble, and as the quantity required is nearer two hundred or two hundred and fifty thousand cubic feet than eighty thousand, the difference would be about £42,000 on the whole work.

We have now, however, obtained further information, and Mr. Sevenoaks has obtained lower quotations for the Indian marble, but the cost delivered at Howrah does not materially differ from the price previously named by me.

The contractors here would undertake to cart marble from the wharf to the site including dock dues for 4 annas instead of 1s. 4d. which had before been suggested as a covering price.

On the other hand, whereas I took Rs. 5-4 per cubic foot for working rough blocks in Calcutta, the contractors' (Martin's) approximate estimate is Rs. 9 or 12 shillings, as against 7 shillings, the cost quoted by the Marmor Company for working the marble in Greece.

This works out as follows, showing a very much greater difference than was previously supposed possible :—

Cost of Makrana marble worked in Calcutta.

	£.	s.	d.
Average rate per foot cube supplied by local contractors under reduced tax landed at Howrah ...	...	0	6 7
Waste 20% (probably more) ...	...	0	1 4
Working, moulding, and fixing on building (contractors' estimate) ...	...	0	12 0
TOTAL ...	...	0	19 11

Cost of Greek marble worked in Calcutta.

	£	s.	d.
Rate per foot cube delivered at Calcutta and carted to site ...	0	5	9
Waste 20% ...	0	1	2
Working, moulding and fixing as per contractor's estimate	0	12	0
TOTAL ...	0	18	11

Cost of Pentelic marble worked in Greece and sent out ready for fixing in Calcutta.

Marmor Company's estimate for working the marble ...	0	11	0
Freight and Insurance ...	0	1	8
Dock dues and cartage to site ...	0	0	4
Fixing ...	0	2	0
TOTAL ...	0	15	0

The relative cost of, say, 80,000 feet cube of either Indian or Greek marble works out thus—

	£
Cost of 100,000 feet cubic of Makrana marble delivered at Calcutta on site @ 6-7 ...	33,500
80,000 feet cubic dressed and fixed @ 12-0 ...	44,000
TOTAL ...	77,500

This includes putting down steam plant.

	£
Cost of 100,000 feet cubic rough Pentelic marble delivered on site @ 5-9	28,750
80,000 feet cubic dressed and fixed @ 12-0	44,000
TOTAL	72,750

Cost of 80,000 cubic feet of Pentelic marble dressed in Greece and sent out and fixed on the building @ 15-0 per foot cubic 60,000

The difference then between Makrana marble worked in Calcutta and Greek marble sent out ready worked is £17,500 per 80,000 cubic feet, or roughly, three times that amount for the whole building or £52,500 more for Indian marble than for Pentelic.

I would, therefore, suggest that, in order to satisfy sentiment, the Makrana marble be used for the domes only, which would allow for plenty of time for quarrying the stones and working them up in Calcutta or at Makrana and that a contract be entered into with the Marmor Company for the supply of, say, 50,000 cubic feet, and as much more as may be necessary, and say 20,000 feet super of 3" facing and bonders, and as much more as may be necessary.

If marble is not forthcoming when a contract is entered into for the superstructures, the contractors here will continually be kept waiting, which will not only delay the work, but probably cause claims for extras to be raised. The question also remains, could the Indian marble be supplied in the quantity and time required; also would it be worked as well out here as in Greece?

Since the foregoing calculations were made, I have received an estimate from Burn & Co. for working marble here and putting down the necessary plant.

Approximate cost per foot cube 5s. 10d. *plus* the cost for plant £7,530 as against 7s. per foot cube, the price quoted by the Marmor Company.

To this would have to be added 2s. per foot cube for fixing. This works out as follows:—

Makrana marble delivered on site	...	...	...	s. d.
Waste 20% (probably more)	...	...	...	6 7
Working and moulding and hoisting	...	...	...	1 4
Fixing	...	...	...	5 10
			...	2 0
TOTAL				...
				15 9 per foot cubic.
Greek marble delivered on site	...	...	...	s. d.
Waste 20% ...	...	...	...	5 9
Working and moulding ...	...	...	...	1 2
Fixing	...	...	...	5 10
			...	2 0
				14 9 per foot cubic.

Relative cost of 80,000 feet cubic.

Cost of 100,000 cubic feet of Makrana at site at 6-7 per foot cube	£
80,000 cubic feet dressed and fixed at 7-10 per foot cube	32,916
Add cost of plant	31,333
	7,530
	71,779

Cost of 100,000 cubic feet of Greek marble on site at 5-9 per	£
foot cube	23,750
80,000 cubic feet dressed and fixed at 7-10	31,333
Add cost of plant	7,530
	<hr/>
	67,613

80,000 cubic feet of Greek marble sent out worked and fixed
in building at 15 per foot cube ... 60,000

So that even with this price, which I think is low for unaccustomed workmen and plant, the difference is for—

80,000 cubic feet of Makrana marble worked in Calcutta	71,779
80,000 cubic feet of Greek marble worked in Calcutta	67,613
80,000 cubic feet of Greek marble sent out ready worked and fixed in the building	60,000

The difference being £11,779 on 80,000 cubic feet more, if Indian marble be used than if marble worked in Greece be sent out ready for fixing, or on the whole quantity required approximately from £35,000 to £47,000.

The questions still remaining are whether the Indian marble could be supplied in the time, and whether it would be worked as well in Calcutta with new machinery as in Greece.

No. 39.

Extrnct from the Minutes of the Meeting of the Trustees dated 29th February 1904.

(a) A discussion took place for the supply of marble for the building of the Memorial, and it was decided, upon the recommendation of the Viceroy, in which Sir William Emerson concurred, that Indian marbles should be employed in so far as this might turn out to be practicable for the terrace, the domes, and the interior flooring. Indian coloured marbles would further be used wherever this was required for decorative purposes. The main building would require to be faced with marble from Greece prepared with the aid of costly machinery (instead of by hand). It was accordingly decided that draft contracts should be prepared for the supply of 50,000 cubic feet of Pentelic marble by the Marmor Co., Limited, with a provision for the supply of any further amount required at the same contract rate. It was also agreed that, subject to the satisfactory arrangements being made with the Durbars, an order for 20,000 cubic feet of Indian marble should be given either to the Jodhpur or Kishengarh States, as the Agent to the Governor-General in Rajputana might recommend.

No. 40.

No. 85—76, dated 3rd March 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States.

Victoria Hall.

I have the honour to thank you for your letters Nos. 942—G-56, 1042—G-56, and 1127—G.56, regarding the supply of Makrana and Jaisalmer marbles for the Victoria Hall.

The matter is under consideration, and I hope shortly to let you know what decision has been arrived at by the Trustees.

No. 41.

Dated 5th March 1904.

From—C. BALTHASAR & SONS, 6 Jackson's Lane, Calcutta,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta.

Enclosed are the lists of statements with quotations showing particulars of sizes and description of Indian "white and coloured" marbles, "flooring slabs" and "blocks" of various weights, &c., for your kind perusal.

As regards reference, we beg to refer you to Mr. Renton of Messrs. Maria & Co., Ajmer.

Furthermore we are prepared to give any reasonable security for the work entrusted to us.

Awaiting your orders.

A.

Statement showing prices of " Flooring slabs " with particulars as to sizes, free on rail at various Railway stations, per 100 pieces.

Description of stone.	Dimensions available.	F. O. R.	Dressed and rubbed.	Chisel raised or nicely dressed.	Roughly dressed.	Per 100 pieces.
			Rs.	Rs.	Rs.	
(1) Kurkuria yellow (plain yellow).	1'×1'×2" 1½'×1½'×2" 2'×2'×2"	Barmer Rail- way Station, J. B. Railway	150 275 505	138 252 468	128 230 431	Do.
(2) Bichia black (mottled black).	1'×1'×2"	Do.	170	160	150	Do.
(3) Bichia yellow (mottled yellow).	1'×1'×2" 1½'×1½'×2"	Do. Do.	170 350	160 325	150 310	Do. Do.
(4) Green and salmon pink varieties.	Same sizes avail- able as No. (1).	Green, Ajmer Railway Sta- tion, B. B. & C. I. Salmon pink, Dausa Railway Sta- tion, B. B. & C. I. Rail- way.	Same prices as No. 1,			
(5) Chittor black	Same sizes avail- able as No. 1.	Chittor Rail- way Station, B. B. & C. I. Railway.	Same prices as No. 1. less 10% less 10% less 10%			
(6) Makrana (white)	Same sizes avail- able as No. 1.	Makrana Rail- way Station, J. B. Railway	Same prices as No. 1. less 5% less 5% less 5%			

NOTE.—A slab 1½'×1½'×2" weighs about 30 seers (more or less).

Freight—from Makrana to Howrah in full wagon loads of 270 maunds @ Re. 0-11-8 per maund for the Victoria Memorial marbles.

Original railway freight rates from Makrana to Howrah @ Re. 0-15-6 per maund, less than a wagon load @ Rs. 1-13-9 per maund.

B.

Statement showing prices of blocks of various weights with particulars free on rail per cubic foot.

Description of stone.	F. O. R.	Weight up to	Price per cubic foot.	Sizes available.
Makrana (white)	Makrana Railway Station, J. B. Railway	Up to 10 mds.	Rs. A. P. 5 8 0 6 0 0 6 8 0 7 0 0 8 0 0 9 0 0	
Black Chittor	Chittor Railway Station, B. B. & C. I.	Available at prices and sizes same as Makrana (white).		
Salmon pink	Dausa Railway Station, B. B. & C. I.	Do.	do.	do.
Bichia yellow (mottled yellow)	Barmer Railway Station, J. B. Railway.	Available at prices same as the Makrana (white).		
Kurkuria yellow (plain yellow)	Do.			
Bichia black (mottled black...)	Do.			
Green	Ajmer Railway Station, B. B. & C. I. Railway.	...	7 0 0	4'×4'×9"

Note.—1 Cubic foot weighs about 2 maunds and 5 seers (more or less).

No. 42.

Dated Calcutta, 14th March 1904.

From—MESSRS. C. BALTHASAR & SONS,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta.

With reference to our letter dated the 5th instant, we beg to inform you that we are in a position to give you immediate delivery for cash at Makrana Railway Station ten thousand maunds of marble in rough (equivalent to 4,500 cubic feet), varying in sizes from $2\frac{1}{2}' \times 1\frac{1}{2}' \times 9''$ up to $7' \times 3' \times 2'$ pieces, weighing from 10 maunds and upwards; prices as per our schedule "B."

We shall also be glad to know from you the particular sizes which you require for the Victoria Memorial Building; so that we can furnish you with the exact quantities we have in stock for immediate delivery.

Awaiting your favour in reply.

No. 43.

No. 109—106-F., dated 19th March 1904.

From—The Superintending Architect, Victoria Memorial Hall, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States.

Victoria Hall.

At a meeting held at Government House on the 29th February last, His Excellency the Viceroy in the chair, it was resolved that certain portions of the marbles for the Victoria Hall should be procured in India, and that the Jodhpur State be invited to submit tenders for the supply of same.

I have the honour to request that you will be so good as to furnish me with prices for the following quantities, at an early date, so as to enable me to lay the matter before the Trustees at the next meeting.

Rates were recently supplied by the Jodhpur Durbar through you, but as they were merely "probable" rates, it is now necessary that some definite figures should be quoted, with a view of entering into an agreement for the supply of marble pending the approval of the Trustees.

The following quantity to be provided and as much more as may be required at the same rate :—

8,000 *cubic feet*—in sizes averaging from 1 to 15 c. ft. each stone roughly squared.

10,000 *feet super*—of 3" facing marble in sizes of 1' 3" high, lengths from 1' 6" to 3' 0"—one face only finely sanded, ready for polishing but not actually polished, square edges and backs.

7,000 *feet super*—of 3" thick bonding stones, 9" on bed in varying lengths from 1' 6" to 3' 0".—One edge only faced and with squared beds and sides. These stones to be picked with dark blue veins or markings, or patches on the faced edge, which is also to be a finely sanded face ready for polishing.

4,000 *feet super*—of stones for facing the domes (only one side faced) worked to curves and radiating joints, and beds. Average lengths from 1' 6" to 3' 0"—all 15" high, averaging 4" thick.

1,000 *feet super*—for bonding stones to domes averaging 4" thick and similar lengths, worked to curves and radiating beds and joints, one edge faced. These bond stones to be picked with dark blue veins on the faced edge.

The rates required will be for c. ft. and s. ft. including carriage, handling at Agra, freight to Howrah and delivery on the site on the Maidan.

No. 44.

No. 2506—G.-56, dated Abu, the 23rd April 1904.

From—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Calcutta.

With reference to the correspondence ending with your letter No. 85, dated the 3rd March 1904, I have the honour to state that the Manager,

Jodhpur-Bikaner Railway, has enquired, in the event of it being decided to use Jaisalmer and Makrana marbles in the construction of the Victoria Memorial Hall, in whose name at Calcutta consignments of these marbles for which reduced rates have been sanctioned should be despatched.

He makes this enquiry as in the absence of any specific distinction it will be difficult to ascertain what consignments are for the *boná fide* use of the Victoria Memorial Hall.

No. 45.

Telegram dated the 24th April 1904.

From—The Private Secretary to Viceroy, Calcutta,

To—H. C. EGGAR, Esq.

Viceroy is very much disappointed at not having received proposed draft of contract for Indian marble with Jodhpur. His Excellency does not know what is letter of invitation issued to Durbars to which you allude, for he has never seen or authorised it. If co-operation of Durbars is required, it is very important that Viceroy should exert his personal influence with them before he leaves India on Saturday next. Please, therefore, send suggested draft at once to Viceroy's Camp.

No. 46.

Dated 25th April 1904.

From—H. C. EGGAR, Esq.,

To—The Private Secretary to the Viceroy.

Following Resolution, meeting 29th February :—Letters written by direction, Building Committee, to Residents, Jodhpur and Jaipur, inviting tender. Reply from Jaipur received, 21st instant. Am forwarding papers. No difficulty anticipated necessitating exertion Viceroy's influence before leaving. Marble not required till last stages of building.

No. 47.

No. 224—F.-224, dated 2nd May 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R. E., C.S.I., Resident, Western Rajputana States.

In reply to your letter No. 2506—G.-56, dated 23rd April 1904, I have the honour to state that all consignments of marbles for the Victoria Memorial Hall should be sent to the Superintending Architect.

No. 48.

No. 3158—56-G., dated Abu, 21st May 1904.

From—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputna States,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Calcutta.

With reference to your letter No. 109 (folio No. 106), dated the 19th March 1904, I have the honour to forward a copy of a letter No. C. and D. 9-1181, dated the 10th May 1904, from the Jodhpur Durbar, giving the rates at which the Makrana marble required for the Victoria Memorial Hall can be supplied by them.

2. A copy of letter No. 322, dated the 8th February 1904, alluded to by the Jodhpur Durbar, was sent to you with this office letter No. 941--G.-56, dated 12th February 1904.

[Enclosures to the foregoing letter.]

No. C. and D. 9-1181, dated 10th May 1904.

From—मेहमा क्हास, Raj Marwar,

To—The Resident, Western Rajputana States.

With reference to the enclosed letter from the Superintending Architect, Calcutta, asking for the prices of the Makrana marble for the Victoria Memorial Hall, I have the honour to inform you that the quantity required of the sizes quoted in the letter under reference can be supplied at the following rates :—

	Rs.	a.	p.	
(1) 8,000 <i>cubic feet</i> —in sizes averaging from 1 to 15 cubic feet each stone roughly spared ... at	2	0	0	per cubic foot
(2) 10,000 <i>feet super</i> —of 3" facing marble in sizes of 1' 3" high, lengths from 1' 6" to 3' 0"—one face only finely sanded, ready for polishing but not actually polished, square edges and backs ...	0	11	0	per sq. foot.
(3) 7,000 <i>feet super</i> —of 3" thick bonding stones, 9" on bed in varying lengths from 1' 6" to 3' 0". One edge only faced and with square beds and sides. These stones to be picked with dark blue veins or markings, or patches on the faced edge, which is also to be a finely sanded face ready for polishing ...	0	11	0	, , ,
(4) 4,000 <i>feet super</i> —of stones for facing the domes (only one side faced) worked to curves and radiating joints and beds. Average lengths, from 1' 6" to 3' 0"—all 15" high, averaging 4" thick ...	1	12	0	, , ,
(5) 1,000 <i>feet super</i> —for bonding stones to domes averaging 4" thick and similar lengths, worked to curves and radiating beds and joints, one edge faced. These bond stones to be picked with dark blue veins on the faced edge ...	1	12	0	, , ,

The rates quoted above include loading charges at Makrana station only, and for freight to Howrah and transshipment at Agra separate arrangements may be made with the railway authorities. I may, however, add that the quotation for No. 1 is the same as given in the statement submitted with my letter No. 322, dated 8th February last; but the rates of Nos. 2 and 3 have been increased by one anna (*viz.*, 11 annas instead of 10 annas) for the additional work that is now required. No rate was previously quoted for Nos. 4 and 5 which are required for domes.

No. 49.

Dated Lucknow, 25th June 1904.

From—MESSRS. F. MARIA & Co., Lucknow,

To—The Secretary to the Trustees of the Victoria Memorial, Calcutta.

Referring to our correspondence ending with your No. 3038, dated 21st October 1903, on the subject of Makrana white and coloured marble for the Victoria Memorial of Calcutta and as it is now definitely settled that a large portion of Indian marbles chiefly from Makrana quarries will be used and as we are prepared now to contract for the entire supply of marble for the building of the Victoria Memorial, we shall therefore feel obliged by your kindly sending us a list of the sizes of pieces required of white marble from Indian quarries—also of coloured marbles.

Our white marble samples you have with you sent by our Mr. Renton from Sikar, Rajputana, last year.

Soliciting the favour of an early answer.

No. 50.

No. 405—F.-400, dated Calcutta, 29th June 1904.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial, Calcutta,

To—MESSRS. F. MARIA & Co., Lucknow.

I am requested by the Trustees to inform you that arrangements are being made for the supply of marble, they therefore regret they are unable to place the order with you.

Thanking you for the trouble you have taken in the matter.

No. 51.

No. 497—5-B. K. 13, dated Cawnpore, 11th July 1904.

From—MESSRS. F. MARIA & Co., Cawnpore,

To—The Secretary to the Trustees of the Victoria Memorial, Calcutta.

We are in receipt of your No. 405—F.-400, dated 29th June 1904. In reply we beg to inform you that nothing is known at Makrana of the arrangements being made for the supply of marble from there for Calcutta Victoria Memorial. Will you let us know, please, if Makrana marble is to be used or not; if it is to be used, who are the people at Makrana to supply you? Please remember that it is more than 18 months that we had correspondence on this business with Mr. Cable and Mr. Cunningham; it was through our suggestions and propositions that the Jodhpur, Bikaner, Bombay, Baroda and Central India and East Indian Railways reduced the freight, and Jodhpur State reduced taxes, and we think we ought to have some share in this work at least for the trouble and interest we had taken for the past 18 months setting things to right.

No. 52.

No. 483—F.-474, dated Calcutta, 8th August 1904.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees of Victoria Memorial, Calcutta,

To—MESSRS. F. MARIA & Co., Cawnpore.

In reply to your letter dated July 11th, 1904, I am directed by the Trustees to inform you they regret they are unable to comply to your wishes but at the same time to thank you for any trouble you may have been put to in obtaining information regarding the supply of Makrana marble, &c.

No. 53.

No. 538—F.-38, dated Cawnpore, 10th August 1904.

From—MESSRS. F. MARIA & Co., Cawnpore,

To—The Secretary to the Trustees of the Victoria Memorial, Calcutta.

We are in receipt of your No. 483—F.-474, dated 8th August 1904, in reply to our No. 497—5-B. K. 13, dated 11th July 1904. We regret the essence of our letter is not answered. Will you please be good enough to let us know as early as you can do so :—

1. Whether any quantity of Makrana white marble is to be used or not in the building of Victoria Memorial?
2. Whether any quantity of Makrana coloured marbles from other quarries in India?
3. Whether any Indian marble is to be utilised or not, white or coloured?
4. If Indian marble is to be utilised, may we know from which part of India and quarries the marble is to come from?
5. Who are the contractors for the supply of Indian marble?

No. 54.

Copy of a letter from Mr. R. L. Sevenoaks, Assistant Architect and Secretary to the Trustees of the Victoria Memorial Hall, dated 17th August 1904.

* * * * *

In reply to your letter, dated August 13th, 1904, as intimated in my letter of July 11th, to Dr. Denison Ross, nothing has definitely been settled regarding the supply of marble from the Jodhpur or Kishengarh Durbar.

Rates, however, have been supplied by the above States for a certain quantity based on a schedule prepared by Sir William Emerson, the Architect, namely, 8,000 cubic feet and 22,000 superficial feet, which will be duly discussed

at the next meeting of the Building Committee to be held within the next fortnight, when it is hoped some decision may be arrived at.

What happened then I do not know.
J. O. MILLER.

This quantity, however, will not be required for some years, as the marble to be supplied by either one of the States is to be used only in the terrace and domes.

* * * * *

No. 55.

No. 665—F.-68, dated Cawnpore, the 1st September 1904.

From—MESSRS. F. MARIA & Co., Cawnpore,

To—The Secretary to the Trustees of the Victoria Memorial, Calcutta.

We beg to invite your very early attention to our No. 538—F.-38, dated the 10th August 1904, and shall thank you to answer the five questions we have therein asked at your earliest convenience and oblige.

No. 56.

Memorandum by LORD CURZON for the information of the Victoria Memorial Trustees, dated 6th September 1905.

On Sunday, September 4th, Sir W. Emerson came to see me in London. He explained that the Marmor Company desired, owing to the fall in exchange (the £ equalling 32 drachmœ now as v. 40 drachmœ in 1903), to revise their terms with the Trustees, and he wished to know whether, owing to the delay and difficulty in getting at the Trustees, I would accept or sign a revised contract on their behalf.

Enquiry elicited that the increase in cost would be very considerable, the price being raised from approximately 11s. per cubic foot to 14s. : and the total increased outlay upon the Memorial, according as 150,000 cubic feet or more are required from Greece, being from £20,000 to £30,000.

I represented not only that I had no authority to execute any such contract, but that the great change in conditions might throw an entirely different light on the problem of employing foreign materials, and compel us to reduce or even to cancel our contemplated orders to the Marmor Company.

I said that in view of this new change it would become necessary for the Trustees to review more closely the cost of production and working in India; that I thought in the interval between now and December a very careful estimate should be prepared in India of the cost of excavation, transport, and preparing the marble with the requisite machinery in Calcutta: that Mr. Gunn should himself come out to Calcutta in the winter with a copy of the contract as he desired to see it revised: that he should state, and if possible demonstrate, his own case at a Meeting of the Trustees in the latter part of December: and thus the Trustees, having before them full information both upon the European and Indian aspects of the case, should then decide whom to employ and what proportion of the material to obtain from each.

Sir W. Emerson undertook to acquaint Mr. Gunn with my decision, and to advise Mr. Sevenoaks to proceed without delay to the detailed enquiry in India which I have suggested. I imagine that the main points in this enquiry will be—

- (a) Cost of production in Jodhpur.
- (b) Cost of freight to Calcutta. I have always thought that if the Government of India gave the lead, the East Indian Railway (and following them the Rajputana Railway) might agree to convey the marble to Calcutta for nothing or next to nothing. Public Works Department might be consulted about this.
- (c) Erection of machinery by Martin or others in Calcutta.
- (d) Provision of skilled labour and degree of rapidity of work.

I am not aware that the Building Committee have ever met. But this is just the sort of work that they might appropriately undertake.

No. 57.

No. 522—F.-12, dated Calcutta, the 14th September 1904.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial,
Calcutta,

To—MESSRS. F. MARIA & Co., Cawnpore.

In reference to your letters of the 10th ultimo and 1st instant, I regret I am not in a position to furnish you with the information you require.

No. 58.

Dated Morhanger Park, Sandy Beds, the 22nd September 1904.

From—LIEUTENANT-GENERAL SIR R. STRACHEY, R.E., G.C.S.I.,

To—His Excellency the Viceroy.

There will, I am confident, be no difficulty in arranging for the carriage of marble required for the Victoria Memorial Hall on satisfactory terms. There is always a certain quantity of "empty running" from the North-West and so far as I can judge the marble might be carried free of charge without causing the Railway any expense, though in ordinary circumstances it would not have been right to abstain from charging for the use of the wagons. The only interests involved are those of the Government and the East India Company, and the Company would, I am satisfied, assent to the concession suggested, for an object so altogether exceptional and national.

I will write to our Agent at Calcutta to tell him that I have given this assurance to your Lordship, and desire him to consider how best to give effect to it, and to let you know about it when you get to India.

* * * * *

No. 59.

Extract from a letter from R. L. SEVENOAKS, Esq., to SIR W. EMERSON, dated 29th
September 1904.

"9. I asked Mr. Mookerjee to give me a rate for laying down a steam plant for working and setting the Jodhpur marble including cost of cranes. He tells me he cannot give the rate himself as the machinery will have to be ordered from home, also the cranes. He, however, will work out the labour rates and send it on to Sir Acquin Martin to fill in the cost of machinery, etc., and ask him to submit the cost direct to you. He will do this this mail.

10. As regards rates for supply of Makrana marble, the following figures are the last received from the Durbar :—

Average size 1—15 c. f. roughly } squared per c. f. }	Rs. a. p.
Freight from Makrana to Howrah .	2 0 0
Handling at Agra (say) . . .	1 6 6
Unloading and loading into carts } at Howrah. }	0 2 0
Carting and unloading at site . . .	0 2 0
State duty	0 4 6
	0 4 0
	<hr/>
	4 8 0

I am enclosing a printed form giving all the rates both by the Jodhpur and Kishengarh States which have been submitted to the Building Committee. If you add Rs. 1-15 for freight, carting, etc., and annas 4 for State duty, in all Rs. 2-3, it will give you the cost of the marble delivered on site.

[Enclosure to above letter.]

Rates supplied by the Jodhpur and Kishengarh States for the supply of marble for certain portions of the building.

At the sixth Meeting of the Trustees, held in the Council Chamber, Government House, Calcutta, on Monday, February 29th, 1904: "It was agreed that, subject to satisfactory arrangements being made with the Durbars, an order for 20,000 cubic feet of Indian marble should be given either

to the Jodhpur or Kishengarh States, as the Agent to the Governor-General in Rajputana might recommend."

In accordance with the above resolution the Architect Sir William Emerson has prepared a draft as follows :—

"Suggested Heads of Agreement with the Jodhpur Durbar for the supply of Makrana marble.

"The marble to be of the best quality from the heart of the quarries, free from all vents, shakes or other defects dark or colour spots or veins, though bluish veins are not objected to, but large and dark patches of blue will be rejected excepting as required and specified in the bond stones.

"The agreement to be for the following quantities :—

"8,000 cubic feet—In sizes, averaging from 1 to 15 c. ft. each stone roughly squared.

"10,000 feet super—of 3" thick facing marble in sizes of 1' 3" high, lengths varying from 1' 6" to 3' 0"—one face only finely sanded, ready for polishing but not actually polished, squared edges and backs.

"7,000 feet super—of 3" thick bonding stones, 9" on bed in varying lengths from 1' 6" to 3' 0". One edge only faced and with squared beds and sides. These stones to be picked with dark blue veins or markings, or patches on the faced edge, which is also to be a finely sanded face ready for polishing.

"4,000 feet super—of stones for facing the domes (only one side faced) worked to curves and radiating joints and beds. Average length from 1' 6" 3' 0"—all 15" high, averaging 4" thick.

"1,000 feet super—for bonding stones to domes averaging 4" thick and similar lengths, worked to curves and radiating beds and joints, one edge faced. These bond stones to be picked with dark blue veins on the faced edge.

"The contract should provide for the above quantities and as much more as may be required at the same rates of each sort specified.

"One thousand cubic feet, and two thousand feet super of facing stones 3" thick and 2,000 feet super of 3" bonding stones to be delivered on the site within 2 years from date of signing the contract, and the whole quantity to be delivered on site within four years of signing the contract.

"Payment to be made at the rate of 80% of the value of the marble on delivery at the site and the balance after the stone has been examined and passed by the Superintending Architect within three months of delivery.

"Any defective stones will be rejected by the Superintending Architect and will have to be replaced by others by the marble contractor at his own cost.

"Should there be unusual delay in delivery and the quantity not supplied within the time named the contract will be determined.

"Details of sizes of stones and of domes will be supplied as required by the Architect, particularly of the rough stones wanted to be given within three months of signing the contract.

"The rates must include carriage, handling at Agra, freight to Howrah and delivery on the site on the maidan."

The Superintending Architect accordingly communicated with the British Residents of Jodhpur and Jaipur, with the result that he is able to lay before the Building Committee the following quotations :—

Quotations from Jodhpur State.

- (1) 8,000 cubic feet—in sizes averaging from 1 to 15 @ Rs. a. p.
cubic feet each stone roughly squared " 2 0 0 per cubic foot.
- (2) 10,000 super feet—of 3" facing marble in sizes of
1' 3" high lengths from 1' 6" to 3' 0"—one face
only finely sanded, ready for polishing but not ac-
tually polished, square edges and backs " 0 11 0 per sq. foot.
- (3) 7,000 super feet—of 3" thick bonding stones 9" on
bed in varying lengths from 1' 6" to 3' 0". One edge
only faced and with square beds and sides. These
stones to be picked with dark blue veins or mark-
ings, or patches on the faced edge, which is also
to be a finely sanded face ready for polishing " 0 11 0 " " "
- (4) 4,000 feet super—of stones for facing the domes
(only one side faced) worked to curves and radiat-
ing joints and beds. Average lengths from 1' 6"
to 3' 0"—all 15" high, averaging 4" thick " 1 12 0 " " "
- (5) 1,000 feet super—for bonding stones to domes
averaging 4" thick and similar lengths, worked to
curves and radiating beds and joints, one edge
faced. The bond stones to be picked with dark
blue veins on the faced edge " 1 12 0 " " "

The rates quoted above include loading charges at Makrana station only, and for freight to Howrah and transshipment at Agra separate arrangements may be made with the Railway authorities.

Quotations from Jaipur State.

SCHEDULE OF PRICES OF THE KISHENGARH MARBLE.

8,000 *cub. feet* from 1 to 15 *cub. feet* roughly squared.

				Rs.	A.	P.	
Price at quarry per cub. foot	...	...	...	1	10	0	
Raj duty	do.	...	...	0	2	0	
Cartage from quarry to Kishengarh station per cub. foot	...	...	...	0	2	0	
Freight from Kishengarh to Agra at rates quoted by railway per cub. foot	...	...	...	0	4	8	} Calculated at 1 cub. feet= 2 mds.
Freight from Agra to Howrah per cub. foot	...	...	...	1	1	4	
Transshipment at Agra per cub. foot	...	...	...	0	2	0	
Cartage from Howrah Station to Maidan, approximately per cub. foot	...	...	...	0	3	0	
TOTAL			...	3	9	0	

10,000 *feet* super of 3 inches facing marble.

Price at quarry per sq. foot	...	...	...	0	12	0	
Raj duty	do.	...	...	0	1	0	
Cartage from quarry to Kishengarh per sq. foot	...	...	...	0	2	0	
Railway freight per sq. foot	...	...	...	0	5	6	Taking 1 cub. foot=2 mds.
Transshipment at Agra per sq. foot	...	...	...	0	1	0	
Cartage from Howrah Station to Maidan per sq. foot	0	1	6	Approximately.
TOTAL			...	1	7	0	

7,000 *feet* super of 3 inches bonding stones.

Same as above	1	7	0
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4,000 *feet* super of stones for facing the domes.

Price at quarry per sq. foot	1	2	0	
Raj duty	do.	...	...	0	2	0	
Cartage from quarry to station per sq. foot	...	...	...	0	2	0	
Freight to Howrah per sq. foot	...	...	...	0	5	6	Approximately at 11 annas per md. and 1 cub. foot=2 mds.
Transshipment	do.	...	...	0	1	0	
Cartage from Howrah to Maidan per sq. foot	...	...	...	0	1	6	Approximately.
TOTAL			...	1	14	0	

1,000 *feet* super for bonding stones to domes.

Same as above	1	14	0
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The railway freight and the cost of transshipment at Agra and loading at Howrah and cartage from Howrah Station to the site on the Maidan having been calculated approximately are liable to correction and supersession by charges that may be actually incurred under these heads.

Comparative costs of marble from Jodhpur (Makrana) and Kishengarh.

Quantity.	JODHPUR STATE.		KISHENGARH.	
	Rate.	Total.	Rate.	Total.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
(1) 8,000 cub. feet (including freight, etc.)	3 10 9	29,375	3 9 0	28,500
(2) 10,000 sq. " " " ...	1 3 0	11,875	1 7 0	14,375
(3) 7,000 sup. " " " ...	1 3 0	8,312	1 7 0	10,062
(4) 4,000 sup. " " " ...	2 4 0	9,000	1 14 0	7,500
(5) 1,000 sup. " " " ...	2 4 0	2,250	1 14 0	1,875
TOTAL ...	...	60,812	...	62,312

These prices have been submitted to the Architect who is in favour of the contract being given to the Jodhpur State. The Superintending Architect is of the same opinion, as the Makrana marble quarries are more opened up than those in the Kishengarh State, and marble from the heart of the quarries can be more expeditiously obtained and brought to the surface, as on the other hand, the Kishengarh quarries will have to be excavated many feet before anything like a satisfactory stone being obtained.

No. 60.

Dated Simla, 1st October 1904.

From—L. W. DANE, Esq., C.S.I., I.C.S., Secretary to the Government of India, Foreign Department.

To—R. L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial.

Though I am not member of the Building Committee I take an interest in the question of the supply of marble for the Victoria Memorial Hall as a Trustee and as specially charged with the interests of the Native States, who have contributed the greater part of the funds and some of whom are owners of marble quarries. I, therefore, venture to write to you to enquire what arrangements you have come to with the Jodhpur and Kishengarh Durbars about the supply of marble. Mr. Miller has shown me papers from Lord Curzon which indicate that owing to a fall in sterling exchange the Marmor Company wish to raise their rates from 11 shillings to 14 shillings per cubic foot, which means an enhancement of from £20,000 to £30,000 in the cost of the amount of marble to be ordered from them.

You will perhaps remember that Sir Patrick Playfair and some other Trustees including myself were most anxious to use Indian marble and only withdrew our opposition to the Greek marble, because it was shown to be cheaper and more quickly obtainable. The present attitude of the Marmor Company may necessitate a change of plans about the marble. I enclose a copy of a Minute by Lord Curzon on the question. We had already ascertained that the railways were willing to charge nominal rates for the carriage of the Rajputana marble and the question of the Mergui marble was, I think, also under consideration.

If you will kindly let me know what is being done and if you wish me to take any action with the Durbars concerned, I shall be much obliged.

No. 61.

No. 548—39-F., dated Calcutta, the 4th October 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States.

I have been instructed by Lord Curzon to obtain a rate from the Jodhpur Durbar for the supply of Makrana marble of roughly squared blocks, any size

required, from 1 to 30 cubic feet, and 10 to 20 cubic feet loaded at Makrana station, in addition to the rates already supplied.

As this information was urgently required, the following telegram was sent you to-day as follows :—

“Lord Curzon desires rates for supply of Makrana marble of roughly squared blocks, any size, one to thirty cubic feet, and ten to twenty cubic feet loaded at Makrana station, in addition to rates already supplied. Kindly wire information before outgoing mail.”

Thanking you in anticipation.

No. 62.

Telegram, dated the 6th October 1904.

From—MEHKMA KHAS, Raj Marwar,

To—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial, Calcutta.

Rate per cubic foot for Makrana marble of roughly squared blocks, any size from one to thirty cubic feet, is rupees four, annas three, and from ten to twenty cubic feet rupees three, annas twelve; these rates include loading at Makrana.

According to the draft you left with me it is stated that stone averaging 1—15 C. F. roughly squared would be required. I am, however, writing to Colonel Jennings, the British Resident, to supply me rates for stone 10—20 C. F. and 1—30 C. F. This I will either wire or send you by post.

No. 63.

Demi-official No. 563—60, dated Calcutta, the 10th October 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial, Calcutta,

To—L. W. DANE, Esq., C. S. I., I. C. S., Secretary to the Government of India, Foreign Department.

I am in receipt of your letter dated October 1st and beg to thank you for the assistance you are so willing to give in connection with the selection and supply of the marble for the Victoria Memorial Hall, and I am sure with reference to the States, little will be done without consulting you.

It would be a grand success if the idea to use only Indian marble could be accomplished, but there is not only the difficulty of facing the cost owing entirely to freight, but could the work, when the marble portion in the super-structure is once started, be continuously carried on, so that the labourers or rather artisans would never be idle? It would be scandalous to have a delay, and highly paid workmen remaining idle because there was not a sufficient stock of marble to go on with, was one of the reasons, besides the cost, for importing foreign stone.

No definite arrangements have been made regarding the supply, though we have received quotations from both the Jodhpur and Kishengarh Durbars. Sir William Emerson, however, is in favour of Makrana marble, and these quarries have been well worked, and stones from the heart are at once obtainable, whereas on the other hand the Kishengarh quarries have only been opened out a few feet.

I received copies of Lord Curzon's Memorandum from Mr. Miller so am returning the one you sent me.

I have gone fully into the matter of cost and delivery on site for the supply of Makrana marble, a statement of which was sent to the Architect (Sir William Emerson) the mail before last, and as requested by him (the Architect), Messrs. Martin & Co. are now preparing a tender for supplying and laying a plant for working Indian marble in Calcutta, in the event of the proposed contract with Marmor Company for the supply of Grecian marble falling through.

The East Indian and Rajputana-Malwa Railways have considerably reduced their rates for conveying marble to Howrah, but if it is carried free the Grecian or any other foreign stone could not be purchased at so favourable a rate as the Makrana marble.

It is to be hoped that some definite settlement will be arrived at at an early date, otherwise I fear the progress of the superstructure next year will be much delayed.

No. 64.

No. 566—F-64, dated Calcutta, the 11th October 1904.

FROM—R. L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial, Calcutta.

TO—J. O. MILLER, Esq., C. S. I.

In reply to your enquiry of 6th instant, the Building Committee have unanimously agreed that Makrana marble from Jodhpur be used in certain parts of the building, but Mr. Eggar informs me that the matter will have to be referred to the Trustees, as the Building Committee are unable as a Sub-Committee to enter into any contracts.

The papers have been in circulation since August 24th, and they were finally returned to me this morning by the Lieutenant-Governor. Arrangements will now be made at an early date for a meeting of the Trustees to consider Messrs. Martin & Co.'s tender.

As suggested by Lord Curzon in his memorandum (copies of which you sent me, I have gone fully into the matter of cost and delivery on site for the supply of Makrana marble, a statement of which was sent to Sir William Emerson, the Architect, the mail before last, and as requested by him (the Architect), Messrs. Martin & Co. are now preparing a tender for supplying and laying down a plant for working Indian marble in Calcutta, in the event of the proposed contract with the Marmor Company for the supply of Grecian marble falling through. A considerable reduction has already been made by the Rajputana-Malwa and East Indian Railways to convey the marble to Howrah at an all-round rate, whether in rough blocks, polished, packed or unpacked, but, if as suggested by Lord Curzon, it could be carried free, the Grecian or any other foreign stone could not be procured at so low a rate as the Makrana marble. Apart from facing the difficulty of cost owing entirely to freight it is very doubtful whether a continuous supply could be maintained, so that the special artisans for the work would never be idle. It would, I consider, be a very serious matter to have a delay, and highly paid workmen remaining idle owing to insufficient stock of marble to go on with was one of the reasons, besides the cost, for importing foreign stone.

It is desirable that some definite arrangement be arrived at an early date, otherwise I fear the progress of the superstructure during the coming year will be much delayed.

No. 65.

No. 7092, dated Abu, the 11th November 1904.

FROM—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States.

TO—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial, Calcutta.

I have the honour to acknowledge the receipt of your letter No. 548, dated the 4th October 1904, regarding rates for the supply of Makrana marble.

2. I repeated your telegram* on the subject to the Marwar Durbar and asked them to supply the required information to you by telegram direct in order

* Dated 4th October 1904.

to enable you to catch the outgoing mail, if necessary.

3. The Marwar Durbar have now forwarded me a copy of their telegram to you on the 6th October 1904, which runs as follows :—

“Rate cubic foot for Makrana marble of roughly squared blocks any size from one to thirty cubic feet is rupees four, annas three, and from ten to twenty cubic feet rupees three, annas twelve; these rates include loading at Makrana station and Durbar duty.”

No. 66.

Extract from a letter from SIR W. EMERSON to R. L. SEVENOAKS, Esq., dated the 2nd December 1904.

“I have got this morning from Messrs. Martin & Co. their prices for putting down steam plant and working in Calcutta. It seems to work out to such a sum as to be prohibitive as to any scheme of working the marble in Calcutta. However I shall go into all this carefully in the report and Mr. Gunn, of the Marmor Company, is proposing to go to India, in accordance with a suggestion of Lord Curzon's, some time this month.

“The reason of all the delay in making a contract with them is the fact that the exchange with Greece has gone down about $\frac{1}{4}$ th in the last eighteen months, which increases the cost.”

No. 67.

No. 633—124, dated Calcutta, the 6th December 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Victoria Memorial Hall, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., Resident, Western Rajputana States.

I have the honour to acknowledge receipt of your letter No. 7092, dated 11th November 1904, and in reply to state that the telegram from the Marwar Durbar regarding certain rates for marble has been duly received by me, a copy of which has been sent to Sir William Emerson, the Architect.

No. 68.

Dated Calcutta, the 13th December 1904.

From—J. DOUGLAS, Esq., Agent, East Indian Railway Company,

To—His Excellency the Viceroy.

I understand from Sir Richard Strachey that you will expect to hear from me on your arrival here in regard to the carriage by the railway from Agra to Howrah of the marble for the Victoria Memorial.

I have, as desired by General Strachey, looked into the matter, and find that practically we have empty wagons continuously running downwards to Howrah, and this being so I have much pleasure in being able to say that I can agree, on behalf of the Company, to the marble being carried *free* of charge

on the understanding that we shall carry it as such wagons are available. The only charge which would then arise, so far as this railway is concerned, would be that for handling at both ends, and this would be for the two operations, say, 8 annas per ton.

It would assist us if as much as possible of the marble were given to us for transport during the months we are least busy, say from July to November.

Permit me to say that it affords me great pleasure to be able to offer this assistance towards the furtherance of an object in which Your Lordship is so keenly interested.

No. 69.

Dated Government House, Calcutta, the 13th December 1904.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—J. DOUGLAS, Esq., Agent, East Indian Railway Company, Calcutta.

I have shown your letter to His Excellency the Viceroy who is exceedingly pleased to hear that the East Indian Railway are prepared to treat the Victoria Memorial Trustees so generously in respect of transport of marble to Howrah. Your letter will be submitted by him to the Trustees, and action will no doubt be taken on it later on.

No. 70.

8, Sanctuary, Westminster, 16th December 1904.

From—SIR W. EMERSON, Architect,

To—His Excellency the Viceroy and the Trustees.

Report as to Grecian and Indian marbles.

On the 29th February last a Resolution was passed by the Trustees authorising a draft contract with the Marmor Company to be prepared for the supply of Pentelic marble, to be worked in Greece and sent out to Calcutta ready for fixing.

When I received the draft contract from your solicitor I communicated with the Marmor Company, who, while quite willing to enter into a contract, point out that since they gave their prices, some eighteen months or more ago, the exchange with Greece has steadily declined from 40 drachmas to the pound sterling to 32·33 drachmas.

This involves, in sending out money from England to pay for the work in Greece, a loss of one-fifth on every pound sterling. They, therefore, said their price must be increased.

As I had no authority to arrange for a contract at increased rates, I requested an interview with His Excellency, and then explained the position.

His Excellency said the matter must again be referred to the Trustees, and requested me to arrange all details of a draft contract with the Marmor Company, and suggested that Mr. Gunn, the managing Director, had better proceed with it to Calcutta so that he could explain to the Trustees all the points and details of it.

His Excellency also requested me to again go very carefully into the comparative cost of Indian marble and the working of it in Calcutta, and report at the same time to the Trustees, and find out as nearly as I could the amount of marble required.

I now have the honour to report as follows :—

It is impossible to get the surveyors to take out the quantities of the marble until the working drawings and rough details have been prepared as a guide to them.

I have, however, had the quantities taken out as accurately as we can in my office, but (not being surveyors) these quantities must be taken as approximate only. I find that there will be about 170,000 cubic feet of marble of which about 20,000 cubic feet would be from Jodhpur, in accordance with the resolution of the Trustees passed at the meeting before mentioned of February 29th last, and worked by the building contractor in Calcutta.

As to the cost of Greek marble.

The price now asked by the Marmor Company is fourteen shillings (14s.) per cubic foot, as an average all-round price, f. o. b. at the Piræus, including all moulded, plain and 3 in. thick facing marble, and five shillings (5s.) per cubic foot for roughly squared marble in stones any size.

Their former prices were eleven shillings (11s.) per cubic foot for worked stones and three shillings and nine pence (3s. 9d.) for rough marble.

Messrs. Martin & Co. have now gone very carefully into the cost of cartage from wharf and hoisting and fixing in the work, and have given me a definite price of two shillings and six pence (2s. 6d.) per cubic foot all worked and moulded stones, and three shillings (3s.) per cubic foot for the 3 in. facing and bonders. Copy of letter enclosed, marked C, Messrs. Martin have also very carefully re-considered the cost of laying down steam plant in Calcutta, and give now as a definite price (their former prices were only approximate) for an average on all classes of worked marble, and fixed complete, the sum of rupees 11 annas 4, equal to fifteen shillings (15s.) per cubic foot, the marble being supplied either from Greece or India. Copy of letter enclosed, marked A.

As to the cost of roughly squared Indian marble.

The final price for Makrana marble obtained by Mr. Sevenoaks from the Durbar of Jodhpur is as follows :—

			<i>Rs.</i>	<i>a.</i>	<i>p.</i>
For roughly squared blocks (Col. Jennings, October 4th, 1904), any size from 1 to 30 cubic feet	4	3 0
Add freight to Howrah	1	6 6
Handling at Agra (say)	0	2 0
Unloading and loading into carts at Howrah	0	2 0
Carting and unloading at site	0	4 6
State duty	0	4 0
Total	6	6 0

Rupees 6 annas 6, equal to eight shillings and six pence per cubic foot delivered on site (8s. 6d.).

As to the cost of worked and moulded Greek marble.

			<i>s.</i>	<i>d.</i>
Cost of worked marble f. o. b. at the Piræus	...	...	14	0
Freight and insurance to Calcutta (say)	...	...	1	8
Cartage to site from wharf, and hoisting and fixing complete (Martin's)	...	...	2	6
Add for contingencies, landing, and dock dues	...	...	0	3
			18	5

I am informed by the firms here who work marble that there is an average of 25 per cent. waste in working up the rough marble.

Cost of using 170,000 cubic feet of Makrana marble, delivered on site and worked in Calcutta and fixed in the building.

		<i>£.</i>	<i>s.</i>	<i>d.</i>
Cost of marble, 170,000 cubic feet, at 8s. 6d.	...	72,250	0	0
Add waste in working rough marble, 25 per cent.	...	18,062	0	0
Cost of working and fixing the marble in Calcutta 170,000 cubic feet at 15s. per foot cube	...	127,500	0	0
Total cost of using Indian marble	...	217,812	0	0

Cost of using 150,000 cubic feet of Grecian marble and 20,000 cubic feet of Indian marble.

	£	s.	d.
150,000 cubic feet of Grecian marble, delivered on site ready for fixing, at 18s. 5d. per foot cube, as above ...	138,125	0	0
Cost of cartage of 150,000 cubic feet to site from wharf and fixing complete, at 2s. 6d. per foot cube ...	18,750	0	0
Cost of 20,000 cubic feet of Indian marble roughly squared on site, at 8s. 6d. per foot cube ...	8,500	0	0
Waste 25 per cent. ...	2,125	0	0
Cost of working and fixing 20,000 cubic feet on building at 15s. per foot cube ...	15,000	0	0
	<hr/>		
	182,500	0	0
Difference between using entirely Indian marble and } Less	217,812	0	0
part Grecian and part Indian ... }	182,500	0	0
	<hr/>		
	35,312	0	0

Then there must be considered the chance of the Jodhpur State being unable to keep up a regular supply of marble, or indeed their being able to supply the large quantity requisite in any reasonable time.

Anyhow, they would have to put down proper steam quarrying plant, which would mean arrangements causing delay of certainly a year or two at the least.

Again, should there be delay, it will mean extra cost in the contract by wages and use of plant over an extended period.

Messrs. Martin in their letter (copy attached, marked B, page 66) say that if Indian marble is decided on they would require at least two years extra for completion, and even then they doubt if we should not have to supplement it by imported marble. As to their other suggestion (see letter B. attached) of arranging to work the rough marble under Mr. Sevenoaks' supervision and adding 10 per cent on to the actual cost for contractors' profit, I do not think that course would be advisable, as the steam plant would have to be put down, and even then the cost per cubic foot would be left indefinite.

I think the Trustees should know once for all the actual cost as nearly as can be ascertained.

The amount of marble estimated—namely, 170,000 cubic feet—may, of course, when the surveyors come to take out accurate quantities, be more or less, but I think it is closely approximate. This amount of 170,000 cubic feet is for facing the whole exterior (quadrangles and all) and interior of the Queen's Hall.

As I pointed out on a former occasion, this might be reduced somewhat by using white Sheorajpore stone, or, perhaps, light buff coloured Chunar stone for facing the bays of the quadrangles and porches in quadrangles to Queen's Hall. If this were thought desirable, it could be arranged after the estimates for the superstructure are obtained.

In order to check the prices given by the Marmor Company and Messrs. Martin & Co., I have obtained rates for an all-round price on the quantities required, for the working of marble were it supplied in London at 6s. per foot cube, the Marmor Company's price for delivering it here. This is with a view to arrive at what the increased price by exchange really means.

The result was as follows, the prices being from four first class reliable firms for working only, exclusive of first cost of marble:—

	s.	d.
Messrs. Tomes, of Hammersmith ...	14	0 per foot cube.
Messrs. Collins, of Vauxhall ...	14	0 " " "
Messrs. Webber & Corben, of Lambeth ...	12	6 " " "
Messrs. Higgs & Hill, South Lambeth ...	11	6 " " "
	<hr/>	
	52	0
	<hr/>	
Average ÷ 4	13	0

The Marmor Company's price for working at an average all-round sum is, as above stated, 14s. including the marble, or, allowing, say, 4s. as the first cost of the marble at the quarries, 10s. per foot cube.

Messrs. Martin's price for working the rough marble, whether Indian or Grecian, delivered in Calcutta, including carting from wharf to site, hoisting and fixing, is 15s. per foot cube.

From these details it appears to me that the Marmor Company's price, even at this increased rate, is a low one, and that Messrs. Martin's for working in an unaccustomed manner with new plant and native labour, is also very fair, as it includes cartage and hoisting and fixing; in fact, deducting the 2s. 6d. for fixing, etc., it is only 2s. 6d. in excess of the Marmor Company, and a little below the average of the prices obtained from the firms here.

Therefore the conclusion I arrive at is that it would not be easy for the Trustees to make more advantageous terms than those offered by the Marmor Company.

I should, however, point out that this is an exceptional and therefore difficult contract to arrange so as to be devoid of risk in the carrying out.

If the work be done in Athens, it will be beyond supervision on the spot, and therefore there may be the risk of some of the work not being up to the specification, and consequently rejections and delay on delivery in Calcutta.

On the other hand, if worked in Calcutta of Indian marble, there is first the extra cost, then the uncertainty of supply, and last the question whether the working by natives with new machinery, to which they are unused, may result in work of the quality desired and described in the specification.

On the whole there appears to me least risk in using Greek marble.

Should the Trustees take this view, then the contract with the Marmor Company should be completed at once and signed and sealed by the Trustees, and provisionally signed by the authorised agent visiting Calcutta, pending the Marmor Company signing and sealing their counterpart and sending it on to Calcutta.

I presume the whole of the work now going on in the foundations and footings will be almost, if not entirely, paid for out of the interest accruing on the paid up subscriptions, which will, I suppose, considerably ease the burden of this increase of cost.

My approximate estimate is as follows :—

	£.	s.	d.
The two foundations contracts amount to some ...	34,991	0	0
The cost of the marble work, if of Grecian, and the terrace and domes of Indian, about ...	182,500	0	0
To complete the building will require about ...	125,000	0	0
Total	342,491	0	0

First Estimate
310,000.

In this estimate I have not allowed for lining the Queen's vestibule with marble, but with Chunar or Mirzapore stone; if marble were used, it would be probably £6,000 more. The increase of cost over my first estimate is caused by about an additional £22,000 by the altered price of marble, and the remainder by the increased size of towers and the altered width and abutments to Durbar Hall, as arranged with His Excellency.

Towards the above sum of about £32,000 increased cost, nearly five lakhs of interest will have accrued by March next on the deposit receipts.

The further interest accruing during the years of building will about pay for the sculpture and decorations, so if a little further money be raised for the grounds and maintenance, the whole cost will be met.

Victoria Memorial Hall, Calcutta.

Memorandum, dated 30th November 1904, by MESSRS. MARTIN & Co., on the cost of working up Indian marble from blocks laid down at site in Calcutta, and already reduced as nearly (as practicable by normal quarry appliances) to the requisite inclusive dimensions.

It is assumed herein : (a) that the Indian marble may prove as refractory to work as the Pentelic, which is harder than the Carrara variety : (b) that a

large plant of modern machinery is necessary to deal with the marble on a sufficiently adequate scale, and (c) that the supply of marble will be regular and in accordance with requirements, so that the plant and establishment may not be idle.

The cost of machinery and adjuncts, as referred to above, may be set down roughly Rs. 1,50,000 (say £10,000) erected at site, and would approximately comprise—

- (1) Screen fencing with gates, etc., around the block yard, the machinery and working yard, and the stock yard for wrought stuff.
- (2) Shedding over machinery and working yard.
- (3) Tramways and a power gantry controlling the three yards.
- (4) Smithy and tool store, with fires, grinding appliances, etc.
- (5) Large lathes for column shafts, and small ditto for balustrades.
- (6) Planers for straight mouldings, and shaper for curved ditto.
- (7) Rippers and frame saws.
- (8) Diamond saws.
- (9) Pneumatic surfacers, drills and cutters.
- (10) Rubbing down machines and polishers.
- (11) Jacks, roller, slings, lewises, trollies, etc.
- (12) All necessary small tools and accessories.

It is open to question whether the sale value of the machinery, etc., would, at the conclusion of the work, more than pay for the cost of dismantling, but the engines, boilers, cranes, etc., might be worth some extra value in themselves, and it is therefore calculated that quite Rs. 1,20,000 (out of the Rs. 1,50,000 cost) would have to be charged to the work, or, in other words, 12 annas per cubic foot wrought, as the cost of machinery.

Exact working rates are always at per superficial foot of wrought surface.

The following rates cover most of the cases :—

Class of Work.			Machining.			Rubbing.		
			Per sq. ft.			Per sq. ft.		
			Rs.	a.	p.	Rs.	a.	p.
Dressing plane faces	...	...	0	12	0	0	8	0
Ditto curved faces	...	...	1	4	0	0	10	0
Ditto circular-circular	...	...	1	12	0	0	12	0
Sawing	...	...	1	0	0	0	8	0
Turning plain shafts	...	...	1	4	0	0	10	0
Ditto balusters	...	...	1	10	0	0	13	0
Ditto bases, bends, etc.	...	...	2	0	0	1	0	0
Mouldings, straight	...	...	3	0	0	1	0	0
Ditto curved	...	...	3	8	0	1	2	0
Ditto straight mitred	...	...	4	0	0	1	4	0
Ditto curved mitred	...	...	4	8	0	1	6	0
Sinking in panels, flutings, etc., extra	..	2	0	0	0	1	8	0

The above rates include handling from the block yard, through the working yard, and stacking in stock yard; but neither carving, other than sinking, nor setting, nor labour spent on blocks that are ultimately rejected.

Deriving cost per cubic foot from the above rates for surface work is much more complex where working only is concerned than where one contractor supplies both material and working. It may be accepted that the proportionate amount of wrought area decreases as the cubic content increases, and (as the difficulty of procuring stones at once large and perfect is considerable) extra cost for size can be set off against lessened cost for wrought area. Suppose a feature measuring 12 ft. by 3 ft. by 2 ft. could be supplied in either one, two, three or four stones, each joint between two stones would involve an extra 12 square feet of dressing, costing, at 12 annas, Rs. 9, and adding therefore 2 annas per cubic foot for each joint to the cost of the feature for working it. Or again, if a feature could be made either with or without a quarry-faced tail equal in volume to the dressed portion, the cost of working in terms

of the cubic quantity would be doubled by dispensing with the tail, while the amount of stone would *per contra* be halved. In all the following rates the cubic quantity is taken to be that of the smallest rectilinear block from which the piece could be cut, *not the nett volume after dressing*. It is further assumed that the construction will be such as to entirely dispense with any quarry-faced tails. The further general assumption below is that the length of stones will be the greatest that can conveniently be handled for the scantlings discussed.

Specimen cubic foot rates, based on the foregoing square foot rates :—

	Rs.	A.	P.
(1) Wall-facing, with stretchers on edge 24 in. by 3 in., and headers on flat, 12 in. by 3 in. (all 3 ft. long) ...	7	12	0
(1 ¹) Ditto, if all stones only 2 ft. long ...	8	0	0
(2) Plain steps 15 in. by 6 in., rubbed all over ...	7	14	0
(2 ¹) Ditto, with moulded nosing ...	10	2	0
(3) Architrave, 18 in. by 8 in., moulded on flat, dressed three sides and rubbed two sides ...	9	4	0
(3 ¹) Ditto, moulded flat and edge ...	11	4	0
(3 ²) Ditto, with mitred mouldings ...	14	4	0
(4) Circular-circular dome-sheeting, originally 9 in. thick ...	8	4	0
(4 ¹) Ditto, cut from blocks originally 6 in. thick ...	11	4	0
(5) Solid ashlars, say 4 ft. by 2 ft. by 1 ft. smoothed two sides	8	12	0
(5 ¹) Ditto, 4 ft. by 1 ft. by 1 ft. ...	4	12	0

Without very close examination of the detail drawings, it is difficult to give cubic foot prices for the different classes of work, but, as we have shown above, the cubic foot rates *increase* with the complexity of the work and *decrease* with the volume of the pieces.

We would, however, present the following rates as sufficiently precise for present purposes :—

	Rs.	A.	P.
(1) All-round price per cubic foot for <i>working</i> and <i>fixing</i> complete, the marbles supplied on the site, whether Indian or Grecian ...	11	4	0
(2) For the elaborate main cornice, separately ..	16	0	0
(3) For all other moulded work, separately ...	11	6	2
(4) For the plain unmoulded work, separately ...	9	0	0

We shall be happy to furnish any further particulars in our power.

MARTIN & Co.

No. 71.

No. 517-C., dated Camp, the 21st February 1905.

From—The HON'BLE SIR A. H. T. MARTINDALE, K.C.S.I., Agent to the Governor-General in Rajputana,

To—The Secretary to the Government of India in the Home Department, Calcutta.

I have the honour to invite a reference to the correspondence the ending with my letter No. 363-C., dated the 3rd February 1905, and to forward, for the

1. Letter No. 427-G., dated the 25th June 1904, from the Resident, Western Rajputana States, and enclosures.

2. Endorsement No 28-C., dated the 6th February 1905, from the Resident, Mewar, and enclosures.

and Rajnagar quarries in Marwar and Mewar, respectively.

2. If the figures quoted in the letter from the Manager, Udaipur-Chitor Railway, are correct, it would appear that the Rajputana marble can be

information of the Government of India, a copy of the communications noted in the margin, giving the rates at which marble required for the Victoria Memorial Hall can be supplied from the Makrana

delivered in Calcutta in the requisite quantities at considerably cheaper rates than those given for Italian marble. The contracts would be a valuable stimulus to the marble industry in the Province, but there are no doubt good reasons for placing the contract abroad.

3. Unless there is any objection, I have the honour to request that I may be informed whether the quality of the Rajputana marble or the price quoted has led to its rejection. Such information would materially assist me in offering advice to the Durbars regarding the further development of their admittedly valuable quarries.

No. 427-G.—36, dated Abu, the 25th June 1904.

From—LIEUTENANT-COLONEL R. H. JENNINGS, C.S.I., R.E., Resident, Western Rajputana States,

To—C. C. WATSON, Esq., I.C.S., First Assistant to the Hon'ble the Agent to the Governor-General in Rajputana.

With reference to paragraph 2 of your endorsement No. 1569—1133-A., dated the 19th May 1904, I have the honour to state that such correspondence as has passed between Mr. Sevenoaks and myself, regarding the supply of marble from the Makrana quarries for the Victoria Memorial Hall at Calcutta, since the article quoted by you at page 29 of the Memorial Fund Journal for March 1904, was written by Mr. Sevenoaks.

2. I do myself the honour to enclose copies of the correspondence cited

Letter, dated 19th March 1904, from Mr. Sevenoaks.

Letter No. 3158-G.—56, dated 21st May 1904, from Resident, Western Rajputana States, and enclosure.

in the margin, between Mr. Sevenoaks and myself which will show how the matter now stands.

3. Mr. Sevenoaks has not yet replied to my letter of the 21st May 1904.

No. 109 (Folio No. 106), dated Calcutta, the 19th March 1904.

From—R. L. SEVENOAKS, Esq., Superintending Architect, Calcutta,

To—LIEUTENANT-COLONEL R. H. JENNINGS, C.S.I., R.E., Resident, Western Rajputana States.

At a meeting held at Government House on the 29th February last, His Excellency the Viceroy in the chair, it was resolved that certain portions of the marbles for the Victoria Hall should be procured in India, and that the Jodhpur State be invited to submit tenders for the supply of same.

I have the honour to request that you will be so good as to furnish me with prices for the following quantities at an early date so as to enable me to lay the matter before the Trustees at the next meeting.

Rates were recently supplied by the Jodhpur Darbar through you, but as they were merely "probable rates" it is now necessary that some definite figures should be quoted, with a view of entering into an agreement for the supply of marble pending the approval of the Trustees.

The following quantity to be provided and as much more as may be required at the same rate:—

8,000 cubic feet.—In sizes averaging from 1 to 15 cubic feet each stone roughly squared.

10,000 feet super.—Of 3" facing marble in sizes of 1' 3" high, length from 1' 6" to 3' 0", one face only fairly sanded, ready for polishing but not actually polished, squared edges and backs.

7,000 feet super.—Of 3" thick bonding stones 9" on bed in varying lengths from 1' 6" to 3' 0", one edge only faced and with square beds and sides. These stones to be picked with dark blue veins or markings or patches on the faced edge which is also to be a finely sanded face ready for polishing.

4,000 feet super.—Of stones for facing the domes (only one-side faced) worked to curves and radiating joints and beds. Average lengths from 1' 6" to 3' 0", all 15" high averaging 4" thick and similar lengths worked to curves and radiating beds and joints, one edge faced. These bond stones to be picked with dark blue veins on the faced edge.

The rates required will be for cubic feet and square feet including carriage, handling at Agra, freight to Howrah and delivery on the site on the maidan.

No. 3158-G.—56, dated Abu, the 21st May 1904.

From—LIEUTENANT-COLONEL R. H. JENNINGS, C.S.I., R.E., Resident, Western Rajputana States.

To—R. L. SEVENOAKS, Esq., Superintending Architect, Calcutta.

With reference to your letter No. 109 (Folio No. 106), dated the 19th March 1904, I have the honour to forward a copy of a letter No. C. & D.-9—1181, dated the 10th May 1904, from the Jodhpur Durbar, giving the rates at which the Makrana marble required for the Victoria Memorial Hall can be supplied by them.

2. A copy of letter No. 322, dated the 8th February 1904, alluded to by the Jodhpur Durbar, was sent to you with this office letter No. 941—956, dated 12th February 1904.

No. C. & D.-9—1181, dated the 10th May 1904.

From—The MEHKWA KHAS, Raj Marwar,

To—LIEUTENANT-COLONEL R. H. JENNINGS, C.S.I., R.E., Resident, Western Rajputana States.

With reference to the enclosed letter from the Superintending Architect, Calcutta, asking for the prices of the Makrana marble for the Victoria Memorial Hall, I have the honour to inform you that the quantity required of the sizes quoted in the letter under reference can be supplied at the following rates :—

- | | |
|--|--------------------------------|
| (1) 8,000 cubic feet in sizes averaging from 1 to 15 cubic feet, each stone roughly squared. | } Rs. 2 per cubic foot. |
| (2) 10,000 feet super, of 3" facing marble in sizes of 1' 3" high, length from 1' 6" to 3' 0", one face only finely sanded, ready for polishing but not actually polished, square edges and backs. | } At Rs. 11 per square foot. |
| (3) 7,000 feet super, of 3" thick bonding stones 9" on bed in varying lengths from 1' 6" to 3' 0", one edge only faced and with square beds and sides. These stones to be picked with dark blue veins or markings or patches on the faced edge which is also to be a finely sanded face ready for polishing. | |
| (4) 4,000 feet super, of stones for facing the domes (only one side faced), worked to curves and radiating joints and beds. Average lengths from 1' 6" to 3' 0", all 15" high averaging 4" thick. | } At Rs. 1-12 per square foot. |
| (5) 1,000 feet super, for bonding stones to domes averaging 4" thick and similar lengths, worked to curves and radiating beds and joints, one edge faced. These bond stones to be picked with dark blue veins on the faced edge. | } At Rs. 1-12 per square foot. |

The rates quoted above include loading charges at Makrana station only, and for freight to Howrah and transshipment at Agra separate arrangements may be made with the Railway authorities. I may, however, add that the quotation for No. 1 is the same as given in the statement submitted with my letter No. 322, dated 8th February last, but the rates of Nos. 2 and 3 have been increased by one anna (*viz.*, 11 annas instead of 10 annas) for the additional work that is now required. No rate was previously quoted for Nos. 4 and 5 which are required for domes.

The Trustees of the Victoria Memorial, dated 25th February 1905.

Memorandum by the Superintending Architect.

In accordance with the wishes expressed by the Architect Sir William Emerson, I have checked the figures and calculations drawn up by him in his report which I estimate to be as follows :—

As to the cost of roughly squared Indian marble.

The final price for Makrana marble obtained from the Durbar of Jodhpur is as follows :—

	Rs.	a.	p.
For roughly squared blocks (Colonel Jennings, October 4th, 1904), any size from 1 to 30 c. ft.	4	3	0
Handling at Agra (say)	0	2	0
Unloading and loading into carts at Howrah	0	2	0
Carting and unloading at site	0	4	6
State duty	0	4	0
TOTAL	4	15	6*

Rupees 4 annas 15 and pies 6, equal to 6 shillings and 7½ pence per cubic foot delivered on site (6s. 7½d.)

* This rate is free of railway freight.

As to the cost of worked and moulded Greek marble.

	s.	d.
Cost of worked marble <i>f. o. b.</i> at the Piræus	14	0
Freight and insurance to Calcutta (say)	1	8
Cartage to site from wharf, and hoisting and fixing complete (Martin's)	2	6
Add for contingencies, landing and dock dues	0	3
TOTAL	18	5

I am informed that there is an average of 25 per cent. waste in working up the rough marble.

Cost of 170,000 cubic feet of Makrana marble, delivered on site and worked in Calcutta and fixed in the building.

	£	s.	d.
Cost of marble, 170,000 c. ft., at 6s. 7½d.	56,312	10	0
Add waste in working rough marble, 25 per cent.	14,078	2	6
Cost of working and fixing the marble in Calcutta, 170,000 c. ft., at 15s. per foot cube	127,500	0	0
TOTAL COST OF USING INDIAN MARBLE	197,890	12	6

Cost of using 150,000 c. ft. of Grecian marble and 20,000 c. ft. of Indian marble.

	£	s.	d.
150,000 c. ft. of Grecian marble, delivered on site ready for fixing at 18s. 5d. per foot cube as above	138,125	0	0
Cost of 20,000 c. ft. of Indian marble roughly squared at 6s. 7½d. per foot cube	6,625	0	0
Waste, 25 per cent.	1,656	0	0
Cost of working and fixing 20,000 c. ft. on building at 15s. per foot cube	15,000	0	0
TOTAL	161,406	0	0†
Difference between using entirely Indian marble and part Grecian and part Indian	197,890	12	6
Less	161,406	0	0
	36,484	12	6

† Omitting £18,750 0s. 0d. for fixing 150,000 c. ft. at 2s. 6d. charged twice over.

Approximate estimate of building as follows:—

	£	s.	d.
The two foundation contracts amount to	37,584	0	0
The cost of marble work, if of Grecian, and the terrace and domes of Indian about	161,406	0	0
To complete the building will require about	125,000	0	0
TOTAL	323,990	0	0
First estimate	310,000	0	0
Excess	13,990	0	0

No. 73.

Dated Government House, Calcutta, the 17th March 1905.

From R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—
 { HIS HONOUR SIR ANDREW FRASER, K.C.S.I., Lieutenant-Governor of Bengal.
 { The HON'BLE SIR FRANCIS MACLEAN, Kt., K.C.I.E., Chief Justice of Bengal.
 { H. H. RISLEY, Esq., C.S.I., C.I.E., Secretary to the Government of India, Home Department.
 { The HON'BLE Mr. R. T. GREER, C.S.I., Chairman of the Calcutta Corporation.
 { The HON'BLE Mr. A. A. APCAR, President of the Bengal Chamber of Commerce.
 { H. C. EGGAR, Esq.
 { W. D. CRUICKSHANK, Esq., C.I.E.
 { DR. E. DENIS N ROSS
 { MAHARAJ-KUMAR PRADYOT COOMAR TAGORE.

I am desired by His Excellency the Viceroy to forward for your information:—

(1) Copy of a letter which His Excellency has written to Sir W. Emerson concerning recent proceedings.

(2) Copies of correspondence that has passed between Mr. Sevenoaks and Mr. Gunn.

I am to remind you that His Excellency is hoping to receive from each of the Trustees, without delay, suggestions as to the best procedure to be adopted for properly testing the Indian sources of supply. Upon receipt of these His Excellency will convene another meeting of the Trustees next week.

No. 74.

Dated Government House, Bombay, the 17th March 1905.

From—SIR P. PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

In response to the invitation of His Excellency to each Trustee to record his ideas of procedure to obtain full information of the cost of procuring a supply of marble from India, I beg leave to offer the following suggestions:—

Recalling to mind these two circumstances:—

(a) That this is the second occasion on which negotiations have been broken off with Marmor, "Limited," for the purpose of obtaining further information about the cost of Indian marble; and

(b) That the Trustees are not satisfied with the investigation made last year by the Superintending Architect (Mr. Sevenoaks) of the Makrana quarries, and the conclusion arrived at by him against the possibility of relying upon large supplies being obtainable from Makrana, at a favourable cost;

And that the Trustees are not satisfied with Sir William Emerson's opinion upon the character of the Sagyin marble;

it is apparent that an enquiry of a much more exhaustive nature is required to satisfy the minds of the majority of the Trustees that the cost of Indian marble is not so far in excess of marble from Europe to preclude its use.

I do not know of any one of authority in India competent to conduct such an investigation and enquiry, possessed of knowledge and practical experience in the most economical and effective methods adopted in Europe of winning the stone from the quarry and of shaping and moulding it by machinery.

I therefore think that the services of an able expert and staff, in whom the Trustees and the subscribers would have confidence, should be obtained from England. There might be disadvantages in engaging experts from Italy or Greece, divulging to them the cost of Indian marble, if the Trustees have ultimately to draw supplies of marble from Europe.

It is probable that firms like Messrs. John Taylor & Son (Mining Engineers), F. W. Manuelle & Son (owners of granite quarries and merchants), Farmer & Brindley or others might be able and willing to advise the Trustees upon the selection of an expert and staff. I know the two firms first named, and would approach them if desired.

I assume borings would have to be made and the quarries would have to be exposed, to enable the experts to test the stone as to good quality and quantity. It might be possible to begin this work prior to the arrival of the chief expert, or conduct the operations during intervals of his visits to India.

I understand that heat at Makrana is excessive; the country inhospitable; no accommodation for Europeans; and local labour scarce. The Trustees will have to decide which season of the year operations can be commenced, and what arrangements will have to be made for the accommodation of the investigators and workmen.

My experience in India is that the members of such a Mission from England have to be made comfortable, and that precautions have to be taken against the outbreak of disease amongst the workmen to avoid interruption of work.

Europeans of Indian experience, having a knowledge of the language, would have to be attached to the party: and a small office establishment, including surveyors, will also be necessary. The Geological Department of the Government of India might be of much assistance to the experts when prospecting.

I assume, further, that certain drilling and cutting machinery will have to be imported, and the supply of fuel (coal, oil, and wood) available in the district to drive the motive power, should be ascertained.

It is difficult to estimate the cost of such a Mission. The cost of the Mission sent out by Lord Rothschild to investigate the property of the Pekin Syndicate in China amounted to about £25,000. The cost of the enquiry conducted by Mr. Robert Peirce and Mr. Wilson sent from home to investigate the value of the concessions made over to the Assam Railways and Trading Company, Limited, amounted, I think, to between Rs. 50,000 and Rs. 1,00,000. The leading Companies formed a few years ago to prospect for gold in Bengal spent on an average Rs. 2,00,000 to Rs. 3,00,000. John Taylor & Son used to charge about 1,000 guineas for a mining report upon a foreign property; the cost of preparing for inspection being in addition.

Unless separate establishments were set up at the various places in India, including Burma, where marble is found, I would not be surprised if an *exhaustive* enquiry, conducted on the lines I have indicated, occupied two to three years, and cost a good round sum of money, at a guess, say, Rs. 2,00,000 to Rs. 3,00,000.

If Indian marble should eventually be decided upon the necessity of engaging the services of an Architect to supervise the work locally should perhaps be considered by the Mission.

If the Trustees decide to conduct this enquiry independently of Sir William Emerson, I would suggest the Architect should not be relieved of the responsibility of ultimately advising the Trustees in the selection of the quality of the marble to be used.

Dated Calcutta, the 18th March 1905 (Private and Confidential).

From—H. H. RISLEY, Esq., C.S.I., C.I.E., Secretary to the Government of India,
Home Department,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Your letter of yesterday on the subject of using Indian marble, instead of Greek, for the Victoria Memorial.

2. I understand that Mr. Holland's enquiries place it beyond dispute that in respect of quality the *Makrana* marble is in every way suited for use in the Memorial building, and that Sir W. Emerson does not dispute this conclusion. The only question then for present consideration is what steps are to be taken with the object of ascertaining whether this marble can be worked up for the purpose of the Memorial at a reasonable cost. This really resolves itself into the question, how can modern machinery, such as we know is used by the Marmor Company, be applied to the exploitation of the *Makrana* marble. When the subject was discussed at the last meeting of the Trustees, the general idea seemed to be that we should put ourselves in communication with some large firm of marble workers in Italy and should endeavour to induce a competent expert to come out to devise a scheme for working marble on a large scale at *Makrana*. Since then I have endeavoured to procure from the Imperial Library some information on the subject of the marble industry in Italy. The report by Mr. James A. Smith, American Consul at Leghorn, printed at page 341 of the volume of Consular Reports, which I send herewith, shows (pages 342-3) that the Carrara methods of working are regarded by American experts as exceedingly primitive; though their retention is probably explained by the fact that labour is cheap and that the quarries themselves (as appears from the article at pages 240-1 of the Century Magazine for May to October 1882), are situated at heights varying from 500 to 3,500 feet from the surface. At Carrara, in fact, you have to climb the Apennines for your marble at varying heights among a number of clefts in different ravines, and it seems possible that the scattered character of the work combined with the cheapness of labour and the conservatism of the quarrymen has rendered it difficult to introduce modern machinery. It seems to me therefore that Italy may possibly not be the best place to go to to find a man who is acquainted with the possibilities of working marble by machinery and I suggest that a reference should be made to America where it appears from the Consular Report which I have quoted that machinery is extensively used and where enterprising capitalists are more likely to be met with. You will find at pages 88—91 of Sir C. Foster's book on the Elements of Mining and Quarrying a brief mention of the endless wire system of cutting marble, with a diagram and the system and a picture of the machine at work. I do not know to what extent machinery can be applied to the production of decorative work on the surface of the blocks of marble used. But there must be some point at which the use of machinery stops and the rest of the work has to be done by hand. It seemed to be assumed at our last meeting that the people who would do this work or, at any rate, a large proportion of them would have to be brought out from Europe. No doubt there must be a certain number of European or American workmen who understand the management of the machinery, but so far as hand work is concerned it seems to me likely that native artisans can be employed with the requisite amount of European supervision to secure that their work shall be not only artistic but accurate. My Personal Assistant for Ethnography, Mr. B. A. Gupte, tells me that the Victoria Terminus at Bombay, the Municipal Offices, Mr. Tata's house, and the marble Chhatra or cenotaph at Bhowanagar were executed by native artisans or *Silavats*. He says that five hundred of these are to be found in Bombay and that Bhowanagar (Kutch) and Porbandar could supply four or five hundred more. Hereditary *Silavats* are also to be found in Gwalior, Jeypore, and Agra. Their wages range from 12 annas to 2 rupees a day. *Silavats* from Guzerat are, I understand, now employed on carving the frontage of the new Military and the Foreign Secretariat. It would seem, therefore, that if we can get the requisite machinery put down for

Cf the table of station rates at page 344 of the Consular Report.

cutting out blocks and slabs roughly in the shape that is required, we can rely on indigenous labour working under European supervision for the subsidiary processes which have to be performed by hand.

No. 76.

Dated Madrassah, the 19th March 1905.

From—DR. E. DENISON ROSS, Trustee, Victoria Memorial,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

With regard to the best procedure to be adopted for testing the Indian sources of marble supply, I beg to submit the following proposals:—

In dealing with this momentous question the Trustees require the services of three experts, namely, a geologist, an architect and a miner with experience of marble quarrying. The two first we of course have on the spot. The last we have not in India, and it is the first business of the Trustees to secure the temporary services of a first class expert in marble quarrying. The best men of this class are probably to be found in America. I would suggest that steps be taken at once to obtain the name of some leading American expert. The Department in Washington corresponding to our Public Works Department could perhaps give us a name of a suitable man, who should be invited to come out to India for a month or so, at his own price. He would be required (1) to confer with His Excellency and others in Simla, and (2) to visit Makrana and possibly other quarries in that neighbourhood. Having in this way satisfied himself as to the precise requirements of the architect and as to the local resources both in men and material, he would return to America, and with as short a delay as possible furnish the Trustees with all the information they require as to machinery, expert labour, &c., &c.

The conference in Simla might be attended by Mr. Risley, Mr. Holland and Mr. Sevenoaks, while the two last named might accompany the expert on his visit to the quarries.

I further venture to propose that ultimately the supply of marble should be undertaken departmentally, instead of through a building committee. The fact that the Indian marble would be carried cost free on a State railway perhaps lends weight to the arguments in favour of the departmental system.

No. 77.

Dated Belvedere, the 20th March 1905.

From—HIS HONOUR SIR A. H. L. FRASER, K.C.S.I., Lieutenant-Governor of Bengal,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Apear, Cruickshank, Greer and I met this afternoon to discuss your letter of 17th instant about the Indian sources of supply of marble for the Victoria Memorial Hall.

We drew up a joint note which clearly, though perhaps not very elegantly conveys our suggestions. I enclose it.

[Enclosure to the above letter.]

NOTE.

We have thought it well to talk this matter over together. We consider that, if it is ascertained that there is sufficient marble of the required quality available at a reasonable cost in the Makrana quarries, there will be no difficulty in extracting and dressing it. That can easily be done by contract or otherwise. The first thing we have to do—and that is the matter about which we are consulted—is to “take steps by inviting tenders or by getting out professional advice from Europe, to exploit the Makrana quarries in a serious fashion.”

2. We think that the Geological Department ought carefully to examine the quarries as to the quality and quantity of the stone and report to the Trustees. Meanwhile the samples we have might be sent (if indeed this has not been done already) to the Secretary of State to be tested as to quality. This may not be necessary as the Indian marble has been already approved for certain parts of the building.

3. Then the Secretary of State should be allowed to send out an expert in marble quarrying to visit Makrana, and (1) report again on the quantity and quality of the marble, and (2) advise the Trustees as to the agency and machinery required to conduct a test experiment as to how much marble of the required quality can be extracted in a given time by certain machinery and at what cost, and to advise the Trustees generally.

4. On his report, if considered satisfactory, we should order the machinery and conduct the experiment. If the experiment proved successful, we should get the marble we require, and should also have established an Indian industry which the Jodhpur State could continue or lease on royalty.

5. To save time, the Secretary of State might be asked to take action as in paragraph 3 above, and have his expert ready to send out when advised by telegram. The Secretary of State has his staff of consulting engineers attached to the India Office, who must be acquainted with the marble market. So it does not seem to us that there need be much difficulty in selecting an expert.

A. H. L. FRASER.

A. A. APCAR.

W. CRUICKSHANK.

R. T. GREER.

BELVEDERE ;

The 20th March 1905.

No. 78.

Dated Tagore Castle, the 20th March 1905.

From—MAHARAJ-KUMAR PRODYAT COOMAR TAGORE,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I am in receipt of your confidential letter of 17th instant. I beg you to kindly inform His Excellency the Viceroy that I am making every possible enquiry as to the best procedure to be adopted for working the Indian quarries. I had two visits from the representative of the firm of Messrs. Gladstone, Wyllie & Co., and I am glad to say that the firm are doing their very best to furnish a detailed scheme for working the Makrana quarries to be placed before His Excellency at an early date.

I have told the gentleman who called on me yesterday that His Excellency the Viceroy wants to convene a meeting of the Trustees before the end of this week, and it is, therefore, highly desirable that his scheme should reach us soon. This he has promised to see to, but at the same time remarked that it was too short a notice to furnish details. As soon as I get the scheme I shall immediately forward it to you for submission to His Excellency the Viceroy. I have also asked Messrs. Balmer, Lawrie & Co. to see me on the same subject.

No. 79.

Dated Calcutta, the 22nd March 1905.

From—The HON'BLE SIR F. W. MACLEAN, Kt., K.C., K.C.I.E., Chief Justice, High Court, Bengal,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I fear I can give no useful assistance as to the steps we should take with a view to ascertaining whether we can wisely and profitably use Indian marble for the Memorial.

I do not know whether any sufficient enquiry has been made in relation to Italian marble, or why, as regards Grecian marble, negotiations apparently

have been only entered into with the Marmor Company. These points, perhaps, are not unworthy of future consideration.

But there is one matter which, I think, the Trustees might not unprofitably discuss at the present juncture. It is, whether, instead of the Trustees entering into separate and independent contracts for the marble, and may be hereafter, for other necessary materials, they should not invite tenders from contractors for the whole building, leaving the contractors to provide the requisite material. We have already made two contracts with Martin & Co., is it intended that we should hereafter make separate contracts for the marble, bricks, wood and iron work, and then with some one to piece our materials together into one whole, and so produce the Victoria Hall? If we adopt this course I fear that a few years hence the Trustees may find themselves in difficulties.

We have an eminent Architect; his plans, specifications and quantities, and an estimate of cost are before us. Would it not be the more usual course, in such circumstances, to invite tenders for the whole building, save of course that portion for which we have already contracted?

When I broached this suggestion some three years ago, we were told—whether upon reliable authority or not I cannot say—that this course was impracticable, because: (1) no English contractor would deem it worth his while to take such a contract, being too small in amount: (2) no Indian contractor was sufficiently reliable. I do not, however, know whether any attempt, or even enquiry, has been made in this direction.

It might be well to ascertain Sir William Emerson's views upon this suggestion: perhaps he has already expressed them.

I respectfully broach the matter for the Viceroy's consideration.

No. 80.

Dated Calcutta, the 22nd March 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Victoria Memorial.

I received your Circular of the 17th instant reminding the Trustees that His Excellency the Viceroy is expecting suggestions as to the best procedure to be adopted for properly testing the Indian sources of supply.

I feel some doubt as to the extent of the proposed operations, whether it is intended to explore all sources of supply in India with a view to ascertaining the quality of marble obtainable from such sources and, after a comparison of the characteristics of the several samples obtained and the cost of quarrying, working, and transport, and the consideration of the probable yield of the several quarries, to make a selection; or whether the operations are to be confined to ascertaining further particulars regarding the Makrana marble and quarries alone. His Excellency in his letter of the 16th instant to Sir William Emerson refers to the desirability of exploiting the Makrana quarries in a serious fashion, a remark which appears to point to an intention to limit the operations to the Makrana marble and quarries. The extent of the operations, is I think, important in considering the procedure to be adopted.

The characteristics of Makrana marble are known. If I remember rightly, samples of Makrana marble were, at an early stage in the proceedings of the Trustees, forwarded to Sir William Emerson in England, and were there subjected to scientific and chemical tests as to strength and ability to withstand atmospheric changes. I think the only substantial objection to the employment of Makrana marble was the expense of quarrying, working and transporting it. Pentelic marble was selected as being better in quality and appearance, and upon the whole, according to estimates then under consideration, less expensive than Makrana marble, and on this ground and because the two different marbles could not be used in the main building, Makrana marble was selected for the domes and terraces.

The present position is—

- (1) that the Trustees would consent to delay the completion of the structure for a few years and to pay a higher price for it, if they could be sure of employing exclusively Indian material ;
- (2) that the Trustees await Sir W. Emerson's opinion on the question whether Indian marble can be exclusively employed ;
- (3) that the Trustees are now proceeding to consider whether more active steps can be taken to exploit the Makrana quarries in a serious fashion—

(1) by inviting tenders.

(2) by getting out professional advice from Europe.

Though your letter requires that I should confine myself to suggestions as to the procedure to be adopted under item (3), I cannot let item (1) pass without the respectful submission that whether the Trustees would be justified financially and legally in adopting Indian marble regardless of comparative cost, *i.e.*, at any cost, must remain for the present an open question.

Assuming Sir William Emerson to be of opinion that Indian marble may be used either exclusively or in considerable proportion in the building, all marble should, as I understand, be obtained from one selected source so as to ensure uniformity in colour and to avoid irregular and unsightly patches in the building. Thus taking Makrana to be the selected source and the quality of the marble from that source to be known and approved, as I believe it to be, the further enquiries to be instituted by the Trustees would be directed to ascertaining with greater certainty—

- (1) the cost of quarrying the marble, and
- (2) having regard to the absolute perfection required, the cost of working moulding, carving and shaping the marble, and
- (3) the cost of conveying the marble from the quarries to the site, and
- (4) an important consideration, the capability of the Makrana quarries to yield the required quantity of marble of uniform colour.

The ascertainment of the cost by inviting tenders would be by far the more satisfactory course. The alternative would be for the Trustees or the Building Committee to make, or to nominate some of their members as a Sub-Committee, or to employ other persons to make exhaustive enquiries upon all points likely to affect the calculation of cost, but this course would entail a great amount of labour, and in the result the information obtained would not, I think, be as reliable as that obtainable through invitations for tenders. If the enquiries are to extend to exploiting all sources of supply in India, the alternative course is the only procedure that can be adopted.

Progress has of course been retarded by the recent resolution of the Trustees, and matters do not appear to me to have reached the stage when invitations for tenders can be resorted to for the purpose of ascertaining the cost of quarrying, working and transporting Makrana marble.

If, upon the consideration of Sir William Emerson's opinion, the Trustees should pass a resolution that Indian (Makrana) marble shall be employed exclusively or in considerable proportion, and the quantity of marble required is defined, it occurs to me that the first step will be to secure a concession or lease from the Native State of the quarries at Makrana at a rent or royalty, with liberty to quarry and get marble therefrom and to make use of all means expedient for such purposes, with necessary rights of way, and with power to erect buildings for housing machinery and workmen and for workshops, and to construct railway sidings and approaches, &c. The concession or lease would be made determinable on notice when all marble required has been extracted and taken.

I do not think any advantage would be gained by attempting any agreement with the Native State. All that the State could undertake would be for a fixed price (as was some time ago proposed in regard to the 20,000 feet of Makrana marble for the domes and terraces) to quarry the marble under

the supervision of an agent appointed and paid by the Trustees, and to despatch the rough blocks to be delivered at Howrah. The Trustees would be left to provide the means of transporting the blocks of marble from the station and of working the marble at or near the site in accordance with the Architect's specifications and plans. I fear that, even if limited to quarrying, an agreement with the Native State would give rise to considerable trouble, and moreover it is questionable if such an agreement, being with a Native State, would be enforceable as a contract in the event of any dispute arising.

The next step would be to get Sir William Emerson to expedite the completion of specifications and drawings. When the specifications and drawings are furnished, advertisements or other invitations might be published or issued for tenders in respect of the whole work of quarrying, working and transporting the marble, and thus the total cost would be correctly ascertained. There would be nothing to prevent the abandonment of the intention to employ Makrana marble in the event of the cost, as more accurately ascertained by tenders, being again considered prohibitive.

Until the specifications and drawings are furnished by Sir William Emerson there will be no sufficient information available to tenderers upon which to base their estimates. The Marmor Company were, I should think, furnished with advance specifications and drawings upon which they made their calculations.

It would, I submit, be advisable before finally deciding upon Makrana marble, to ascertain, with as much certainty as possible, the capability of the Makrana quarries to yield the required quantity of marble of uniform colour. This, I imagine, could be ascertained only by an expert in applied geology. I do not know if there is such an expert in Government service or any independent expert in India possessing the requisite knowledge; if not, it would seem advisable to engage an expert in Europe. If, as it appears to me to be, the ascertainment of the capability of the quarries as to quantity is a necessary preliminary to selecting Makrana marble, should it be decided to use Indian marble exclusively, the expert would be employed by the Trustees at the expense of the building fund.

It would seem the better course to await Sir William Emerson's opinion, and, subject to what he may advise or suggest, to proceed to enquiries as to an expert to test the capabilities of Makrana quarries, and then to await the receipt of specifications and plans proceeding in due course to the invitation for tenders.

No. 81.

Dated Calcutta, the 23rd March 1905.

From—H. H. RISLEY, Esq., C.S.I., C.I.E., Secretary to the Government of India,
Home Department,

To—E. D. Ross, Esq., Ph.D.

I discovered a few days ago some papers sent up by Martindale showing (I write from memory)—

- (1) that Makrana marble, cut and shaped for the dome of the Memorial, can be delivered at Makrana Station for about Rs. 2 or Rs. 3 per cubic foot;
- (2) that machinery for working marble *in situ* would cost Rs. 25,000.

The authority for (2) is one Heineman, Manager of the Udaipur-Chitor Railway.

I have sent the papers to His Excellency and have now only to suggest that, before we meet to-morrow, you might look through the correspondence in your possession and see—

- (a) whether Sir Swinton Jacob was ever consulted;
- (b) what is the basis of the Rs. 4-3 in the estimate in Emerson's note.

No. 82.

Dated Tagore Castle, the 23rd March 1905.

From—MAHARAJ-KUMAR PRODYOT COOMAR TAGORE,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I beg to enclose, for His Excellency's perusal, two letters from Messrs. Gladstone, Wyllie & Co. and Messrs. Balmer, Lawrie & Co., regarding the supply of Indian marble. Will you kindly inform His Excellency the Viceroy that I shall be quite willing to serve on the Building Committee, should His Excellency be pleased to appoint me again this year?

[Enclosures to the above letter.]

Dated Calcutta, the 20th March 1905.

From—MESSRS. GLADSTONE, WYLLIE & Co.,

To—MAHARAJ-KUMAR PRODYOT COOMAR TAGORE, Tagore Castle.

With reference to our Mr. Giannacopulo's interview regarding Indian marbles suitable for building the Victoria Memorial Hall, we have started inquiries and shall, as early as possible, give you all particulars. We may mention we have already submitted quotations through Mr. Sevenoaks for the well-known Sagyin marble of Burma, which, as you have doubtless seen, takes a magnificent polish and is of a description to absorb little or no moisture and will not crumble away in years as many marbles do to an extent sufficient to disfigure a building. Our quotation is a low one, and possibly might be still further reduced if there is a likelihood of its being taken as we would approach the Steamer Companies and induce them to reduce their freights, as this would be for a National Memorial.

We shall advise you on our inquiry as early as possible, although the time allowed us is short.

Dated 133, Clive Street, Calcutta, the 21st March 1905.

From—MESSRS. BALMER, LAWRIE & Co.,

To—MAHARAJ-KUMAR PRODYOT COOMAR TAGORE, Calcutta.

With reference to the writer's personal interview this morning we have telegraphed our native friend at Jubbulpore asking him to come to Calcutta immediately, and have impressed upon him the necessity of coming at once if he has a desire to negotiate for the supply of marble for the Victoria Memorial. If he is in the station, we should receive his reply by the latest to-morrow and will again write you.

No. 83.

Memoranda by the Superintending Architect, dated 24th March 1905.

Regarding the question raised and discussed at the last two meetings of the Trustees of the Victoria Memorial at Government House as to using Indian marble in place of Grecian, and the most advantageous means to adopt for ascertaining the cost and likelihood of such a scheme proving practicable, I beg to submit the following suggestions and remarks for the consideration of the Trustees:—

1. The first step to be taken in a project of this kind I consider would be to have the locality from which the marble is to be obtained—in this case the Makrana quarries in Rajputana—prospected by an expert and to ascertain the probable quantity and quality of the stone.

During my visit to these quarries last year and as stated in my report, I found that though five quarries were being worked only two of them were to any degree properly opened out and the best marble was only procurable in that known as "Jhoonpa" which had been excavated to a depth of about 120 feet, and about 40 feet wide. There are, however, formations of clay and rock in "Jhoonpa," and bands of marble run through these formations varying in

thickness from 1 foot to 3 feet, but as the whiteness is not continuous, but runs into tints of blue and green at the edges, it is doubtful whether any blocks of one colour wider than two feet could be procured.

In the "Kala Dunjee" quarry which is in close proximity to the "Jhoonpa" quarry, the quality of the marble is inferior, but this is owing no doubt to the fact that this quarry has been very little worked and the stones at present obtained are more of the surface, but by deeper excavation, stone as superior as the "Jhoonpa" could possibly be secured.

In the case of the "Jhoonpa" quarries it is not known how far north or south they could be extended and whether the marble would be sufficiently good both in quality and colour.

The whole strata of the marble lies in one continuous range of hills at an elevation of about 60 feet above the surrounding plain, running north and south so that though the "Jhoonpa" quarries are situated conveniently near the main line (a distance of about a mile) it may of course be necessary for obtaining the whole supply, to open up other portions of the hills, which may perhaps be a mile or two further north or south of the station. I therefore consider it would be necessary and certainly advisable in addition to securing the services of an expert, to obtain the opinion of a geologist to further investigate the matter and report.

In Mr. Blount's report on the analysis of Makrana marble—dated London, July 9th, 1903—a sample of which he analysed and tested for weathering—he is of opinion that "the marble is of good quality and resists weathering agencies well; it is, however, in these respects slightly but distinctly inferior to the samples previously examined." Before entertaining the Makrana marble I would propose that it be put to some further tests to ascertain the atmospheric influence on the marble, as it should be borne in mind that the climatic conditions are considerably distinct between the North-West Provinces and those of Lower Bengal.

2. The second stage for investigation would be the matter of providing machinery, explosive and tackle for opening out the marble, and a suitable plant for cutting when brought to the surface.

3. Thirdly for laying a metre-gauge line from the quarries and for transit to the main line.

4. Provision of a suitable staff of European artisans for properly supervising and working the marble.

5. Suitable quarters for the staff and other establishment on the site would have to be erected.

I would further suggest that to be in a position to form some idea as to the supply of suitable and sufficient tackle, machinery, plant, etc., for both excavating and working the marble, and the cost of the same, that an enquiry be made personally at some of the quarries in Italy and Greece where the work is going on, and that a practical man be deputed for the purpose on an early date. As to the expenditure of working the above scheme, it is I consider at present not at all practicable to form any idea. I would therefore suggest that as soon as the prospecting has been carried out, Mr. T. H. Holland, Director, Geological Survey of India, or any one else, be asked to report. If the report is satisfactory, some firms of standing in India, not necessarily in Calcutta only, may be approached and estimates called for, for the supply of the necessary quantity and cost of marble on the site, on the same lines as the Marmor Company.

As to time, until the prospecting scheme is finished, it is impossible to say.

R. L. SEVENOAKS,
Superintending Architect.

No. 84.

Extract from the Minutes of the Meeting of the Trustees of the Victoria Memorial, dated 24th March 1905.

* * * * *

2. The first matter brought forward for discussion was the question of the rate for marble furnished by the Jodhpore State through the British Resident Colonel Jennings.

The President said it was not clear how the average rate, namely, Rs. 4-3-0 per cubic foot was arrived at, seeing that in a previous estimate based on a specification supplied by the Architect, the rate quoted was only Rs. 2-0-0 per cubic foot. The Superintending Architect reported that the Rs. 4-3-0 rate was calculated on blocks varying in size from 1—30 cubic feet, whereas the rate Rs. 2-0-0 per cubic foot was only for blocks 1—15 cubic feet, the price increasing according to the size of the blocks. The President did not think that this was a fair basis of calculation for the entire amount of marble required, and he was not prepared, without further examination, to accept the average rate of Rs. 4-3-0 adopted by Sir William Emerson in his report of December 16th, 1904. The Secretary was instructed to print the correspondence that had passed between Colonel Jennings and the Superintending Architect, relative to rates for Makrana marble, and to circulate it to the Trustees for information and guidance.

3. The question of employing Indian marble for the Victoria Hall was further discussed.

The President stated, that, in response to a letter addressed by him to the Trustees on this subject (dated March 11th, 1905) he had received replies from all the Trustees expressing their views, which he summarised for the information of the Meeting. After some discussion it was decided to address the Architect (Sir William Emerson) in the following sense :—

“The services of an expert in marble quarrying to be procured from England. Before proceeding to India, the expert should probably visit suitable quarries in Italy or other places on the Continent, in order to make himself acquainted with the latest improvements in respect of plant, machinery and cutting now employed in European quarries, with a view to the adoption of similar methods in India. Upon his arrival in this country probably in September next) he should proceed to the field of operations and make an examination of the Makrana quarries. During the interval, Mr. Holland, of the Geological Department, should be asked to make such preliminary investigations and borings as his staff were capable of carrying out, in order to economise time. The expert having completed his enquiries would probably proceed to Simla to discuss the matter with His Excellency the Viceroy. His engagement would probably be for a period of six months from date of appointment, with free return passage, out-of-pocket expenses and such fee as the Architect might advise. In the event of a satisfactory report, the Trustees would call for tenders in India for laying down the necessary plant and machinery for working the quarries, and for delivery of the required quantities and sized blocks cut and ready for fixing in the building.”

No. 85.

Dated Calcutta, the 25th March 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

At the Trustees' meeting yesterday I referred to the possibility of casting the responsibility of the ascertainment of the capability of the Makrana quarries to yield the required quantity of marble of uniform quality and colour upon whomever should contract for the work of quarrying, working and transporting the marble. When drafting my note of the 22nd instant I added a paragraph to this effect, but on reading through my draft I decided to omit it. I think, having reference to what passed at yesterday's meeting, that the abandoned paragraph may be useful as a reference on some future occasion, and I, therefore, ask permission of His Excellency to add it, for what it may be worth to, my note. It is this :—

Assuming the Trustees to have arrived at a conclusion regarding the suitability of Makrana marble, and to have decided either that a special contractor should be employed for the work of quarrying, working and

transporting the marble or that the building contractor should obtain his own supply of marble from Makrana, it would be possible to impose upon such special contractor or the building contractor, as the case may be, the risk and expense of ascertaining the capabilities as to yield of the Makrana quarries. In the advertisement inviting tenders either for the separate work of quarrying, working and transporting the marble or for the work in the superstructure of the building as a whole, it might be stated as a condition, that persons desirous of tendering must, at their own risk and expense, obtain all information for the purpose of making their tenders, including the ascertainment by experts or others of the capability of the Makrana quarries to yield marble according to specification in sufficient quantity for the completion of the building. The possible danger of adopting this course would be that, should the quantity of marble yielded be eventually less than anticipated by the contractor or required by the contract, the Trustees will be left to procure marble from some other source. The contractor would, in such event, be liable for any excess in cost in procuring other marble, but, as the aim of the Trustees is uniformity, the recovery of damages from the contractor would be of secondary importance and unsatisfactory.

No. 86.

No. 842—350-F., dated Calcutta, the 29th March 1905.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial,

To—The Private Secretary to His Excellency the Viceroy.

At the last meeting of the Trustees held at Government House on Friday, 24th instant, His Excellency stated it was not clearly shown in Sir William Emerson's report, dated December 16th, 1904, how he had arrived at the rate of Rs. 4-3-0 per cubic foot for marble, when in a previous estimate the price quoted by the Jodhpur State was Rs. 2 per cubic foot.

His Excellency considered that the calculation should be based on the actual rate for each block and not worked on an average figure.

As I should like this point to be made quite clear to His Excellency, I have the honour to enclose a memorandum showing the usual method adopted in striking the average in such cases. The total cost of any one quantity it will be seen, whether calculated at separate rates or at an average rate, is the same.

I am, of course, not in a position to know how Sir William Emerson arrived at his rate of Rs. 4-3-0 having no data as to the several rates for the different sizes and quantities of marble he worked on, but I feel sure that he must have adopted this recognized formula.

If you still think there may be any difficulty in reconciling this rate of Rs. 4-3-0, I shall be very pleased to call and see you.

Makrana marble.

					Rs.	A.	P.
8,000	c. ft.	of blocks averaging 1-15	c. ft.	at			
		Rs. 2-0-0	c. ft.	...	16,000	0	0
10,000	sqr. ft.	at Rs. 0-11-0	sqr. ft.	...	6,875	0	0
7,000	sqr. ft.	at Rs. 0-11-0	sqr. ft.	...	4,812	8	0
4,000	sqr. ft.	at Rs. 1-12-0	sqr. ft.	...	7,000	0	0
1,000	sqr. ft.	at Rs. 1-12-0	sqr. ft.	...	1,750	0	0
TOTAL					36,437	8	0

To obtain an average rate as per above the formula is as follows :—

	Rs.	A.	P.
8,000 c. ft. at Rs. 2 c. ft.	16,000	0	0
10,000 sqr. ft. 3" thick, at Rs. 0-11-0 sqr. ft.=2,500 c. ft. at Rs. 2-12-0 c. ft.	6,875	0	0
7,000 sqr. ft. 3" thick, at Rs. 0-11-0 sqr. ft.=1,750 c. ft. at Rs. 2-12-0 c. ft.	4,812	8	0
4,000 sqr. ft. 4" thick, at Rs. 1-12-0 sqr. ft.=1,333 c. ft. at Rs. 5-4-0 c. ft.	7,000	0	0
1,000 sqr. ft. 4" thick, at Rs. 1-12-0 sqr. ft.=333 c. ft. at Rs. 5-4-0 c. ft.	1,750	0	0
	<hr/>		
13,916 c. ft.			
TOTAL ...	36 437	8	0

To find the average rate for the above quantity divide cubical contents by cost.

$$\frac{\text{Rs. } 36,437-8-0}{13,916 \text{ c. ft.}} = \text{Rs. } 2-9-10 \cdot 73066. \quad \text{Rs. A. P.}$$

Therefore 13,916 c. ft. at Rs 2-9-10 ·73066 per c. ft. = 36,437-8-0.

It will be seen from the above figures that the total expenditure comes to the same whether taken at each separate rate or at an average rate.

R. L. SEVENOAKS,
Superintending Architect.

No. 87.

No. 485, dated Calcutta, the 31st March 1905.

From—H. H. RISLEY, Esq., C.S.I., C.I.E., Secretary to the Government of India,
Home Department,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have spoken to Mr. Holland regarding the inquiries to be set on foot by the Geological Department in connection with the proposal to use Indian marble for the Victoria Memorial. Mr. Holland proposes to visit Makrana at once and to settle, after inspecting the locality, what operations may be required in the way of boring, etc., for the purpose of ascertaining whether a sufficient supply of marble is available within a reasonable distance of the rail.

Mr. Holland also suggests that he should accompany the marble expert, who is to be brought out from home, when the latter visits Makrana, in order to explain to him the geological aspects of the question and to advise him as to the veins in which the best marble is likely to be found.

As regards the foundation stone Mr. Holland says that his Department will have no difficulty in arranging for that as soon as they are informed of the size required. It is of course desirable to give them early notice so that they can select a block of the best quality.

I shall be glad to know, as soon as possible, whether His Excellency approves of these arrangements. Mr. Holland has never been to Makrana, and it seems desirable that he should look round the place before giving instructions for boring. It is possible that the geological indications may be sufficient to guarantee the existence of an ample supply at a reasonable depth without any boring at all.

No. 88.

Dated Government House, Calcutta, the 31st March 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—H. H. RISLEY, Esq., C.S.I., C.I.E., Secretary to the Government of India, Home Department.

Many thanks for your letter about the inquiries to be set on foot by the Geological Department in connection with the proposal to use Indian marble for the Victoria Memorial.

The Viceroy agrees to the proposal that Mr. Holland should visit Makrana at once for the purposes named in your letter.

Dated Camp, the 6th April 1905.

From—HIS EXCELLENCY THE VICEROY,

To—Sir W. EMERSON, Kt., 2, Grosvenor Mansions, 76, Victoria Street, S.W.

I now write to you the further letter foreshadowed in my previous letter of March 16th—so as to acquaint you with the later deliberations and decision of the Trustees.

I said in my earlier letter that we were not quite satisfied with the calculations upon which the cost of the Indian marble had been worked out. There is a further item that appeared to us to need some explanation. In your letter of 16th December you estimated the cost of the Makrana marble at Rs. 4-3 per cubic foot; and this was the chief item in the total cost of Rs. 6-6, or 8s. 6d., at which you calculated the Indian marble delivered on site. But this calculation would seem to be open to some question; for in the first place, a subsequent letter from Colonel Jennings of 11th November 1904 shows that the price of Rs. 4-3 includes not only loading at Makrana station, but also State duty, whereas you have charged separately, I think, for the former, and certainly for the latter.

Secondly, the Trustees could not understand, nor could Mr. Sevenoaks explain, why, blocks of differing sizes and shapes being evidently required for the building, and different prices having been named by Colonel Jennings for these, *e.g.*, Rs. 2 per cubic foot for blocks of 1—15 cubic feet and Rs. 3-12 per cubic foot for blocks of 10—20 cubic feet, you should have calculated the entire 170,000 cubic feet at the maximum price of Rs. 4-3 for the maximum size of blocks. These considerations, in addition to those named in my former letter, led the Trustees to think that the estimates of the probable cost of building the Victoria Hall with Indian marble could not be implicitly relied upon, and that (from the point of view of pecuniary outlay) it had been condemned on inadequate grounds.

Accordingly the Trustees resolved to proceed with a much more sustained investigation of our Indian resources before these are rejected as impracticable. At the same time we are anxious to take no step except in the closest consultation with you: and it is with the object of soliciting your co-operation at the present stage that I am now writing this letter.

The Trustees decided to engage and to summon to India, for the purpose of advising them as to the possibility of obtaining the entire supply from the Makrana quarries, an expert in marble quarrying, familiar with the latest improvements in quarrying, plant, and machinery. We do not imagine that a man of the same scientific attainments or rate of pay as are required in the case of a prospecting Engineer for minerals would be called for: since we want him not to explore or discover, but to tell us how to work existing and visible supplies. It seemed to us, therefore, that some one who had himself superintended or taken part in marble quarrying elsewhere would best meet our requirements. We would pay the journey to and from India of such a man, his out-of-pocket expenses in the country, and such fee (presumably from £500 upwards) as you might recommend.

Our idea is that as soon as he has been selected, he should, unless he already possesses the knowledge, visit those marble quarries on the Continent or elsewhere, where the latest implements and methods of extraction and preparing the blocks, are employed: that he should then come out to India during the rains, say in July or August; that he should probably visit Calcutta to see the site of the Hall and to discuss matters with Sevenoaks; that he should then proceed to Makrana (which before September or early October would probably be uncomfortably hot), and make a detailed examination of the quarries, then drawing up his report for presentation to the Trustees, and advising them as to the amount of marble procurable, the cost and methods of extraction, the nature of the agency to be employed, and so on. By the time that the Trustees, including myself, return to Calcutta at the end of November, we ought to be in a position to come to a decision. The total deputation of the expert might then have extended to six months and he might be engaged for that period with an extra fee of so much per month for any excess period.

Meanwhile before he comes out we shall not ourselves be idle. We have sent off our Geological Director, Mr. Holland, to Makrana, and he has authority to employ drills and any other forms of prospecting or quarrying that may be required, in order to prepare the ground for the expert, and to enable the latter to form reasonably rapid conclusions as to the thickness of the seams, quality of the marble, etc.

This is a rough sketch of what we decided to do. Whether the expert should be some one in the employ of a great firm like Farmer and Brindley, or whether he should have been the managing agent or foreman of some big quarries, we cannot say. We venture to leave this in your hands: confident that you will select for us the best type of man procurable.

When he has reported, the next step will be to invite tenders from contractors in India or elsewhere. There will be no reason why the European employers of the expert (if such there be) should not themselves tender for the entire work. Of course they would have to face the competition of the Indian firms such as Messrs. Martin.

It may be thought that a more ordinary procedure would be to impose upon the firms of contractors tendering the entire responsibility of satisfying both themselves and us as to the capabilities of the Makrana quarries and the cost of working the same. This is quite true. But the Trustees would not be saved thereby from any miscalculation or subsequent failure on the part of the contractor: and they prefer therefore to assume the responsibility themselves, and only to throw open the affair to contractors when they have satisfied themselves that there is a reasonable chance of success.

It is very difficult for me, not being a business man, to state these matters as they should be stated. But I hope I have said enough to give you a general idea of what we have in view, and it remains for me only to ask you to help us as loyally and efficaciously at the present stage as you have done throughout. The Trustees are quite resolved not to deal with Marmor until all the doubts and apprehensions that I have stated are resolved: and until they are satisfied upon expert authority that India is out of the question. Of course the expert must be a man who will come out with an open mind; not in order to write a report or secure an order in favour either of Carrara or Pentelikon or any other quarries. Such a man had better not come at all. We have a strong idea that the marble for the entire building could be supplied from India, and that is the point about which we mean to be thoroughly satisfied and desire the best advice.

P. S.—You will probably require to telegraph to me in connection with this subject. “Viceroy, Simla,” will find me.

No. 90.

Dated Viceroy's Camp, Rampur, the 6th April 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,
To—R. L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial Hall.

* * * * *

His Excellency has written a letter to Sir W. Emerson about the proposed engagement and despatch of an expert, and a copy of this letter will be circulated before long to the Trustees.

In the meantime I am to suggest to you that pending his arrival it would be desirable to utilise the forthcoming rainy season by procuring and exposing to the open air in Calcutta (inside the enclosure) a few very large blocks of (1) Makrana marble, (2) any other Rajputana marble that seemed to promise well, (3) Sagyin marble, (4) the stacked marble of King Mindon. If a few blocks of 15—30 cubic feet could be procured and left out of doors throughout the year, we might get some idea of the manner in which they are likely to weather in the humid atmosphere of Bengal. The Viceroy requests you to act upon this suggestion without delay. One or two large blocks of each kind of marble would probably suffice.

Extract from a letter from R. L. SEVENOAKS, Esq., to SIR W. EMERSON, dated 6th April 1905.

"2. There was another meeting of the Trustees held on Friday, March 24th, at Government House, and *inter alia* your calculations as to comparative cost of Grecian and Indian marbles (*vide* your report, dated December 16th 1904) were discussed.

The Viceroy stated he could not understand how you had arrived at an average rate of Rs. 4-3-0, when in a previous estimate based on your specification (a copy of which I enclose for reference) the price quoted was Rs. 2 only. I tried to explain that you must have arrived at this rate by striking an average on all the rates quoted by the Jodhpur State. His Excellency said if this was so your statement "For roughly squared blocks (Colonel Jennings, October 4th, 1904) any size from 1—30 cubic feet Rs. 4-3-0" was misleading and confusing, and that he was certainly inclined to think your calculations were based on this and only rate, which would increase the cost of the marble by about 50 per cent. I stated I was not in a position to say how you had arrived at your calculations, not having any data before me, but, as there was a recognized way of making these calculations, I presumed you must have adopted it. To make my point clear, I worked out the ordinary formula (a copy of which I enclose) based on the various sizes of stones specified by you and the rates supplied for same by the Jodhpur State. The Viceroy, though accepting my formula as correct, is still of opinion that you had calculated the whole 170,000 cubic feet on blocks, averaging 1—30 cubic feet at Rs. 4-3-0.

I should, therefore, feel obliged if you would kindly let me know how you arrived at your Rs. 4-3-0 rate, and also if you would send me particulars of all the various sized stones in cubic feet varying between 1—30, 1—15, 1—20 and so on as well as the quantity and sizes of bonding and face stones which will be in square feet. On going further into your calculations, I notice that you have added State duty twice over. This of course should not be, as it is already included in the Rs. 4-3-0 rate, *vide* Colonel Jennings' wire, a copy of which I sent you in my letter No. 567, dated October 12th, 1904.

* * * * *

10. I am afraid in the event of the Trustees, deciding to use Indian marble it will be at least two years before we shall be ready to start the superstructure. Should, however, they decide to use some of the Grecian in the meanwhile, we might perhaps make a start next year after laying the foundation stone."

No. 92.

Dated the 7th April 1905.

From—SIR W. EMERSON, Kt., 2, Grosvenor Mansions, 76, Victoria Street, London, S. W.,

To— HIS EXCELLENCY THE VICEROY, Calcutta.

* * * * *

Again, if Makrana marble were used, it must mean that proper steam plant be put down to work the quarries and to do this and open up to the heart of the best beds may cost anything from twenty to one hundred thousand pounds which certainly could not come out of the Memorial Funds.

I learned yesterday from a man who has been staying for some time with the Raja of Mysore, that a large quantity of this Indian marble is being used in the new palace and that they have to wait months for each block and are now supplementing it with Sicilian which does not look at all well in conjunction with it.

As to the cost I gave of working Indian marble, Mr. Sevenoaks in revising my estimates deducted the amount for railway freight. I had not heard in

making my estimates, of the arrangement Your Excellency had come to in regard to the railways; the difference even then was £36,484.

Working the marble at Makrana instead of Calcutta would involve the contractors in the cost of two responsible staffs, one at the quarries and one in Calcutta, meaning double cost and also considerable risk of mistakes in the setting out of the building and working the marble at a distance with men unaccustomed to such work.

I should think it might be worth while to make enquiries of some of the marble merchants in Calcutta (I believe there is one very respectable man named Augusteno) as to what they know of the durability of Indian marble in Calcutta: the test of Makrana was not equal to the test of Pentelic, and Agra and Calcutta are very different in their atmospheric conditions.

Another point is, arrangements to obtain Indian marble would take so much time that the work already done in the foundations would either deteriorate or require considerable outlay in maintenance.

Besides this, in Messrs. Martin's letter sent with my estimate some time ago, they pointed out that if Indian marble were used they would want considerably longer time in which to carry out their contract. This again must mean extra cost, as the workmen's wages would have to be paid for a longer period.

Whether Indian or Grecian marble be used, my only desire is to get the best, and I can only lay the facts as I find them before the Trustees, who in making their decision will, I hope, remember that it is as difficult for me to come to any conclusion, as it is for them. As I have pointed out before, the position and circumstances are altogether exceptional, and there are chances of difficulties and complications, with the work whatever marble is selected.

Sir Swinton Jacob, with whom I had a long conversation on the subject when he was here, said he thought that if Indian marble were used, we should run a great risk of never getting the quantity we require.

Mr. Brock, the Sculptor for the Victoria Memorial here, told me last night that the Marmor Company's quotation is 17-6 per foot cube; this is no doubt in consequence of the chance of a further fall in exchange.

I will reply in full to Your Excellency's letter later on when I hear further.

No. 93.

No. 858—374-F., dated Calcutta, the 10th April 1905.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial Hall,

To—LIEUTENANT-COLONEL R. H. JENNINGS, R.E., C.S.I., British Resident, Western Rajputana States, Jodhpur.

I have been instructed by His Excellency the Viceroy to secure two blocks of white Makrana marble (roughly dressed) not less than 30' 0" cubic feet each for atmospheric experiments. I have, therefore, the honour to request that you would be so good as to send me two such blocks at your very earliest convenience. I should also be glad to have two slabs about 3' 0" long, 1' 6" high and 3" thick.

As it is important that these stones should be delivered at an early date, I shall feel obliged by your putting the matter in hand at once and advising me when they are likely to be delivered in Calcutta.

No. 94.

Dated Calcutta, the 10th April 1905.

From—R. L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial Hall,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I am obliged to you for your letter dated Viceroy's Camp, Rampur, the 6th April 1905, enclosing the draft of the Minutes of the Meeting of March 24th as revised by His Excellency.

I have written to the Hon'ble Mr. L. M. Jacob, Secretary to the Government of Burma, Colonel Jennings, British Resident, Jodhpur, and Colonel Pears, British Resident, Jaipur, respectively, for two sample blocks of Sagyin marble and marble quarried for King Mindon, Makrana and Kishengarh marble, and on their arrival will have them placed on the site of the Victoria Memorial Hall within the enclosure according to His Excellency's wishes.

No. 95.

Dated Calcutta, the 14th April 1905.

From—The HON'BLE MR. R. T. GREER, C.S.I., C.S., Chairman, Calcutta Corporation,
To—R. NATHAN, Esq., C.I.E., Private Secretary to the Viceroy.

I enclose an interesting letter on the subject of marble for the Victoria Memorial.

It will be seen that a Syndicate is prepared to spend money and does not ask very much at the hands of the Trustees.

I learned in the course of conversation that, in the event of the failure of Indian marble which is not anticipated, the Syndicate will be ready to supply Greek marble at a reasonable price.

[Enclosure to the above letter.]

Dated Calcutta, the 11th April 1905.

From—MESSRS. BIRD & Co. and MESSRS. MARTIN & Co., Engineers and Contractors,
To—The HON'BLE MR. R. T. GREER, C.S.I., C.S., Chairman, Calcutta Corporation.

There appears to be a general feeling among the subscribers to the Victoria Memorial Hall Fund that Indian marble should be used in the building of the Memorial—a feeling which, we think, is shared by the Trustees of the Fund and the general public. We therefore write to inform you, as one of the Trustees, that we, the undersigned Messrs. Bird & Co. and Messrs. Martin & Co., are desirous of forming a Syndicate or Company for the purpose of opening out and developing the Indian marble fields, quarrying the marble and supplying the same to the Trustees for the building of the Memorial Hall.

We are prepared, on learning that the Trustees are inclined favourably to consider our proposals, and, in the event of our being able to obtain the necessary concessions, to work the quarries, to go to the initial expense of bringing out a marble expert to examine and report on such deposits as are at present known, with the object of ascertaining whether such are of sufficient extent to supply the required quantity of marble.

In the event of our expert's report being satisfactory and such as will justify our proceeding further in the matter we shall be ready to submit a tender to the Trustees for the delivery of the marble in trucks at quarries or at the nearest station thereto and to bring out a complete working plant.

Some time must necessarily elapse before our arrangements can be sufficiently advanced to undertake such a contract, for it will first be necessary to obtain the required concessions.

Our object therefore in now addressing you is to ascertain whether the Trustees of the Victoria Memorial Fund can give us their assurance that they are prepared to consider favourably the supply of Indian marble to the Victoria Hall.

No. 96.

Dated Kenilworth, Simla, the 19th April 1905.

From—T. H. HOLLAND, Esq., Director, Geological Survey of India,
To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

Will you kindly inform His Excellency that I have examined all the marble quarries, as well as the unopened exposures of marble near Makrana,

and, as soon as possible, will prepare a full report for the information of the Trustees of the Victoria Memorial Hall. But before completing the report and including proposals for the quarrying operations, I should like to know approximately the quantities of each kind of marble required—

- (a) of pure white marble in small slabs and blocks;
- (b) of pure white marble in blocks of 20 to 30 cubic feet; and
- (c) of grey-lined or streaked marble in small blocks.

2. I understood from Mr. Risley that about 300,000 cubic feet of all kinds will be required within about five years, and on this assumption I should not hesitate to conclude that there need be no difficulty whatever in extending the existing operations to meet the requirements of the Memorial Hall, and that all the appliances necessary can be obtained readily in India. I consider it unnecessary to bring out an expert in marble-quarrying; but as soon as I know the quantities of each kind of marble required, I will mark out the places most suitable at Makrana, and will make precise proposals for the criticism of engineers.

No. 97.

Dated the 21st April 1905.

From—JAMES PUTNAM, Esq.,

To—T. H. HOLLAND, Esq., Kenilworth, Simla.

In reply to your letter to Mr. Nathan of the 19th instant, enquiring as to the approximate quantities of each kind of marble required for the Victoria Memorial Hall, I am desired to request that you will ask Mr. Sevenoaks for the information that you desire.

No. 98.

Dated Simla, the 26th April 1905.

From—T. H. HOLLAND, Esq., Director, Geological Survey of India,

To—R. NATHAN, Esq., C.I.E., Private Secretary to the Viceroy.

In accordance with the instructions which His Excellency gave me last Saturday, I send herewith a note on the marble quarries at Makrana. I am sorry that the submission of this note has been delayed till to-day, but I have been interrupted by numerous urgent references and by illness. In order that the note may not be delayed by copying, I shall be glad to send you a second copy if His Excellency decides to send the note home by the outgoing mail.

2. You will notice in paragraphs 17—20 that, whilst I anticipate no difficulty in the quarrying operations and consider the importation of an expert for this work to be unnecessary, it may be necessary to import an expert stone-cutter or possibly a number of artisans, for special parts of the work.

[*Enclosure to the above letter.*]

Note by T. H. HOLLAND, Esq., Director, Geological Survey of India, on the occurrence of marble at Makrana, Rajputana.

Disposition of the
marble beds.

1. The marble beds of Makrana rise above the desert sand as three ridges running across the Jodhpur-Bikaner railway line in a N.N.E.—S.S.W. direction, the beds showing a regular dip of 60° to E.S.E. The associated amphibolites, schists and granitoid gneisses, belonging to the Aravalli system are sometimes found projecting through the sand near the flanks of the ridges, but the junctions are nowhere sufficiently well exposed to show the total thickness of the marble beds.

The Eastern ridge.

2. The most prominent ridge crosses the railway at about a quarter of a mile west of the station, extending for half a mile in the northerly direction and over five miles to the south, varying in visible thickness according to the level to which the sand has drifted up the slopes, but with an average width of about 250 feet, and rising in places to 70 feet above the general level of the desert.

3. The other two ridges further west are smaller, the middle band being about a mile long with a thickness above sand of over 50 feet, whilst in the westernmost ridge the principal hill is 80 feet high with a thickness of 150 feet. The westernmost ridge is worked for a pale-grey marble, and yields no pure white material; but in the other two ridges pure white bands alternate with the uniformly grey and the grey-streaked varieties, with occasional bands of the pink variety, which appears to be less regular in its development, being due to local variations in composition. The Central and Western ridges.

4. The easternmost ridge is the one most extensively worked, the principal quarries forming a continuous stretch of workings for over a mile to the south of the railway with, however, smaller excavations to the north, and others at intervals to the extreme south, where a white marble of medium grain is being quarried for Messrs. Adam & Co. of Agra. Quarries in the Eastern ridge.

5. The quarries near the railway line in the easternmost ridge have followed the bands of pure white marble down to depths, in two instances, of 120 feet, the grey and banded varieties on the flanks being generally neglected. No attempt is made to approach the bands by cross-cuts in the side of the hill, and no machinery of any sort is used, blocks of 60 or 70 cubic feet being rolled from the bottoms of the quarries, over roughly constructed stone causeways, to the surface, and when too heavy for the ordinary bullock cart, are merely pushed or rolled across the sand to the railway station. Most of the material is, however, reduced at the quarries to sizes which are possible for transport by bullock cart to the cutting yards in Makrana village.

6. The beds exposed in the quarries immediately south of the railway show thicknesses of marble, wholly or mostly white, varying from 6 to 30 feet, between beds of the grey and streaked varieties, which are discarded by the present quarrymen. It would be safe, I think, to assume that in any of these quarries a thickness* of 20 feet of practically pure white marble can be obtained, whilst the grey and streaked varieties form the rest of the ridge interrupted, however, by thin veins and lenses of pegmatite and amphibolite, which would, as shown below, form a serious difficulty in the way of employing wire saws of the kind used in the European slate and marble quarries. Thickness of white marble beds.

7. If we assume the 20 feet to be the available thickness of the marble in the eastern, or principal band, we shall, I consider, be estimating the resources of the ground without chance of possible exaggeration, and if we assume a waste of 50 per cent. in the working, which I also consider generous, the marble required for the Victoria Memorial, estimated by Sir William Emerson at 170,000 cubic feet, could be obtained by work to a depth of 34 feet for 500 feet along the strike, or by work to a depth of 68 feet for a horizontal distance of 250 feet.

8. If we assume that throughout the whole length of 6 miles along which the principal band is exposed at Makrana, we could obtain no more than 10 feet thick of suitable marble, the quantity available for every 15 feet in depth would be $6 \times 5, 280 \times 10 \times 15 = 4,752,000$ cubic feet.

Deducting a half of this for waste, the quantity marketable would be 2,376,000 cubic feet, or enough white marble to build a dozen structures of the size of the Victoria Memorial Hall. And still the exposures of good marble at Makrana would be well above the level of the desert sand, affording facilities for economical quarrying operations.

9. It would be possible thus to raise all the marble required by the concentration of work along 500 feet of the chief marble band in any suitable section of the exposures near the railway. To raise the required quantity of material in this area would involve a very simple modification of the present system—the mere introduction of simple mechanical aids to increase the speed, and possibly to reduce the cost of quarrying. The relation between the total quantity required for the Memorial Hall and the total resources of the Makrana deposits is obviously one that is not worth further discussion.

10. The existence of masses free from joint planes and foreign inclusions permitting the separation of large blocks of uniform composition is demon- Occurrence of large blocks.

*That is, total thickness..

strated satisfactorily by the material being turned out by the present workers. I made the following measurements as examples amongst many of the large blocks of white marble lying at the time of my visit in the quarries in the eastern band, just south of the railway line :—

		Feet	
In Gulab's quarry	...	$7 \times 3 \times 1\frac{1}{2}$ $7 \times 2 \times 2\frac{1}{4}$	
In Mustafa's quarry	...	$9 \times 5 \times 2$	Two blocks of this size split from a single mass of pure white marble $9 \times 5 \times 5$.
In Allah-ud-din's quarry	...	$7 \times 3 \times 2\frac{1}{4}$ $11 \times 3 \times 2$	Two blocks of this size split from a mass, $11 \times 6 \times 3$.
In Quadr Baksh's quarry	...	$9 \times 4 \times 3$ $11 \times 8 \times 4$	Ten blocks of this size. A mass without joint planes about to be split up.

Larger blocks would be obtainable in some places if the quarrymen possessed mechanical aids for removing them from the quarry. These remarks refer to white marble only, though larger masses of the streaked varieties are obtainable, especially in the central band where I measured one block which had been shaped *in situ* for a large bath-tub measuring outside $13' 5'' \times 12' 10'' \times 7' 3''$.

Possible rate of supply. 11. The next question to consider is the possibility of maintaining the supply of suitable marble at a rate which will not delay building operations. I understand that the total quantity required, 170,000 cubic feet, should be supplied within a period of five years. At an uniform rate, this would mean 34,000 cubic feet a year, or about 2,900 cubic feet a month.

Present output of the Makrana quarries. 12. During the past year, April 1904 to March 1905, the average daily attendance of quarrymen at Makrana has been 93, the highest attendance being during the last month of this period, due to a recent increase in the demand for white marble to be used in the memorials at Lucknow, Ajudhiya and Ferozepore. I have obtained from the Station Master at Makrana returns for the monthly despatch of carved marble recorded in the railway books as maunds, but convertible into cubic feet at the rate of 1 cubic foot = $2\frac{1}{4}$ maunds. The returns are as follows :—

Month.		Maunds.	Cubic feet.
April 1904	...	1,917	
May	...	2,862	
June	...	3,515	
July	...	3,524	
August	...	3,653	
September	...	2,663	
October	...	1,767	
November	...	1,586	
December	...	3,440	
January 1905	...	3,072	
February	...	2,518	
March	...	4,229	
TOTAL		34,746	15,443

13. The present output of white marble at Makrana is thus a little under one-half of that which would be required for the Memorial Hall, or assuming that the rate of demand will not be uniform, it may be necessary to arrange in any one year for an outturn of three times as much as that now obtained, or say 45,000 cubic feet in a year. It is hardly necessary to point out that in such a long stretch of quarries, and of ground still untouched, there is room for the employment of many more than three times the number of quarrymen now employed. Any one who has seen the quarrymen at work would not stop to consider the question of over-crowding, even if it were proposed to employ ten or twenty times the number of men now at work.

14. Quarrymen, one knows, are plentiful in India, and offer no difficulties against migration to meet special local demands for public works. I would not hesitate, consequently, to assert that, with no disturbance of present methods, and by the mere increase of quarrymen, the amount of marble required for the Memorial Hall can be turned out as fast as the builders will require it.

15. But the deposits at Makrana are admirably suited to the application of simple mechanical means for increasing the present output. A railway siding aligned along the principal ridge of marble, and a few frames with travelling winches to lift the blocks into the trucks would replace the present bullock cart and the coolies, who take a week, sometimes, to transfer a block from the quarries to the village. For the railway siding, the ground is perfectly flat between the marble ridge and the station, whilst the length of metre-gauge line, uniform with the Jodhpur-Bikaner Railway, will depend on the site selected for the quarries. A mile, at a cost of Rs. 5,000, using old rails from the main line, would probably be quite sufficient. In view of their subsequent use for the quarries, the Jodhpur Durbar is willing to meet the small initial cost of these improvements.

16. A certain amount of improvement in quarrying operations would be possible by the use of channelling machines, which will not involve a heavy outlay ; but the question of introducing wire-saws and machinery of the kind of Monticolo's penetrating pulley must depend largely on the quality of the marble required.

If the material were accepted of the kind employed in the Taj and the Moghul buildings generally, wholesale excavation would be possible within any limited area at Makrana, and mechanical means of the kind referred to might be useful. But if special varieties are to be selected, there would be no market for the bye-products of streaked marbles turned out with the white and grey. In view of this circumstance, and the fact that thin veins and lenses of pegmatite occasionally occur in the marble beds, I consider it inadvisable to employ wire-saws. The native method of quarrying can, of course, be improved in many ways : it is at present as primitive as it possibly could be ; but it permits of great elasticity and freedom in selecting the special qualities required for any particular building, and is capable of expansion to meet all the requirements of the Memorial Hall, which are altogether on too small a scale to permit of the introduction of any expensive machinery. Any outlay in machinery should be devoted to the cutting processes, where uniformity in size and accuracy of joints are essential characters.

17. In the quarrying operations I anticipate no difficulty whatever : any contractor would readily bind himself to produce the quantity required for the Memorial. Mr. F. C. Dixon, a partner of Messrs. Adam & Co., Agra, who have a depôt at Makrana, went over the ground with me, and agreed that there should be no difficulty in meeting the demand of the builders. On behalf of his firm he said that he would be willing to accept a contract to produce all the marble required, cut and polished, packed, free on rail at Makrana, and with each piece ready for insertion in its place in the building, for an all-round rate of Rs. 6 per cubic foot. This offer might possibly be modified, one way or the other, after a detailed examination of the designs, and I quote it merely as evidence of the opinion of an experienced contractor and engineer who knows the ground and local conditions intimately. I am not recommending Messrs. Adam & Co., for I found that the native workers are maintaining artificially high rates against them for reasons that need not be detailed here, and I think consequently that, unless Mr. Dixon made a mistake, the quotation he gave of Rs. 6 per cubic foot would be above, not below, the correct figure for polished stones.

18. It is on the important question of cutting and preparing the stones that I am unable to offer any opinion of value. I am not able to gauge the quality of the work of the native cutters ; but the work I saw done at Makrana struck me as distinctly high in quality, and certainly low in cost. There are about 500 cutters in the village, but only about 200 of these are regarded as first-class cutters able to lay out a design, the others being entrusted with the preliminary work of shaping. The work of polishing is mostly done by women and small boys. The preliminary smoothing is done by the successive use of a red sand-stone from the Vindhyan beds near Merta and a cream-coloured more

compact variety from Khattu in Jodhpur. The final polishing is obtained by using a piece of cloth charged with a paste made from the oxide produced by burning spelter. No smoothing and polishing machines of any sort are used.

19. The principal loss of time at present appears to be due to the absence of means for cutting the blocks by saws. A certain amount of work is done by two workmen using a piece of hoop iron working in the usual way with sand and water, but it is evident that even with the low rate of wages at Makrana, a considerable saving in time and money, and an increase in accuracy of work would be obtained by using mechanical saws for the preparation of large quantities of blocks and slabs of uniform dimensions. An increase in cutting speed would also be secured by using the sharp-edged sand made by crushing, instead of the rounded grains of desert sand.

20. For the Memorial Hall, I understand, a large fraction of the material required would be in uniform sizes, and for the cutting and polishing of these it would be possible to erect simple machinery. This is a point on which the opinion of an expert in stone cutting is desirable. From my general knowledge of the subject I anticipate no difficulty whatever in meeting the demand for carved and polished stones either by the employment of imported workmen, or by education of the native workers under a capable manager.

Advantages of
organising the
cutting and
polishing at
Makrana.

21. There would be advantages, I think, in arranging for the work of carving at Makrana, not in the village necessarily, but at or near the principal quarries served by the railway siding :—there is already there a nucleus of good workers; it would be easy to reject stones which might reveal flaws after cutting, not visible in the rough blocks; the climate permits work in the open air throughout the year; the material not required for the Hall could be placed on the permanent market; the rate of wages is low, so-called expert workers obtaining not more than the equivalent of Rs. 9 or Rs. 10 in British rupees, and there is an abundance of room around the quarries without trespassing on cultivated fields or villages. The population of Makrana is about 4,000, and the country around is capable of supporting a material increase.

The question
of quality.

22. On the question of quality I would prefer to leave a definite statement until the tests which I am arranging are complete. I understand from Mr. Bertram Blount's report that the samples of Makrana marble tested by him, gave, on the whole, satisfactory results, but that he considered its coarseness of grain to be a sign of inferiority. As far as strength and resistance to weather are concerned, I hold that the coarseness of grain, being due to a more perfect intergrowth of the crystals and to absence of granulation since their formation, are characters from which I should expect the Indian marbles generally to be able to resist the weather better, and to be stronger than most of the marbles from Italy and Greece. Before the end of the next monsoon I hope to have precise results to test this conclusion, but the test which have been made already for porosity have shown results distinctly in favour of Indian marbles, the absorption of water in equal times being in the following proportions :—

Sagyin, Burma	...	...	...	...	15
Makrana, Jodhpur	...	...	...	...	27
Mergui, South Burma	...	...	...	...	26
Tonkra, Kishengarh	...	...	...	...	28
Pentelikon, Greece	...	...	...	...	50
Carrara, Italy	...	...	...	...	52

The Sagyin marble is by far the most coarsely crystalline of the lot examined, and its low degree of porosity is exactly the result which would be expected from its microscopic structure.

23. There are, I understand, other disadvantages in coarse-grained marbles, the principal being their liability to cleavage along the rhombohedral crystal faces, and the reflection of light from the cleavage facets below the surface. On these grounds the native marble of America is considered, according to Professor G. P. Merrill (Stones for Building and Decoration, New York, 1891, page 383) to be inferior to the marble imported from Europe and Northern Africa.

24. But at Makrana a sufficiently fine-grained marble is obtainable to permit of its taking a sharp arris and smooth surfaces with a perfect polish. At the same time the structure, as shown by microscopic sections, indicates a perfect inter-growth of the crystals and the absence of the granulitic characters, which is so pronounced in the case of Carrara marbles imported into this country, that after exposure to the weather they can be often crushed to a medium-grained sand. On these points of quality more precise conclusions will be possible after the completion of the tests now in hand.

25. The object of this note is to show that at Makrana :—

Conclusions.

- (a) there are sufficient resources in white and grey-streaked marble to meet all the requirements of the Victoria Memorial Hall ;
- (b) that the marble beds are disposed in a way to permit of economic quarrying and to permit of a development of the present rate of output to meet the increased demand ;
- (c) that it appears to be possible to arrange for the local preparation of most, and probably all, the carved stones required ; and
- (d) that there are at present reasons for assuming that the material used will be as lasting as material imported from Europe, when exposed to the climate of Lower Bengal.

No. 99.

Dated Simla, the 27th April 1905.

From—His Excellency the Viceroy,

To—SIR W. EMERSON, K.T., 2, Grosvenor Mansions, 76, Victoria Street, London, S. W.

I have duly received your letter of April 7th, and your telegram of 11th April announcing that Marmor have now withdrawn their offer. I am not surprised. I do not think that we have any desire to resume negotiations with them. I am sending you a telegram to-day, asking you to suspend any arrangements until you have received this letter. With it I enclose—

- (a) a letter from Messrs. Bird and Martin offering to form a syndicate to supply the Indian marble and to bring out a marble expert, if required ;
- (b) a report from Mr. Holland, Director of our Geological Survey, whom I sent off to the Makrana quarries a few weeks ago with instructions to report upon the question of quantity, existing production, and methods of working.

I think that his report will provide an answer to many of the doubts that you have expressed. In the first place, it shows that there is not the slightest question as to (a) the abundance of supply, (b) the possible speed of delivery. It also gives useful information as to the local labour. Mr. Holland tells me that he was astonished at the excellent work being turned out for all the various Victoria Memorials throughout India. He says that he does not think that an expert in marbles or in quarrying is at all required, but that an expert stone-cutter and possibly some skilled artisans for particular classes of work may be called for.

You will, I am sure, consider all these facts and advise us accordingly.

One important point is whether you wish the Hall to be built of pure white or of streaked and bluish marble. I was again at the Taj the other day, and renewed inspection showed that it is built almost exclusively of the latter—which I think must be one of the reasons for which it presents so soft, mellow, and restful an appearance, instead of dazzling the eye. The Pentelic marble was nearly pure white, but it had not to face the Indian sun. When we get to work, a decision on this point will be essential.

I may add that I have ordered some big blocks of the Makrana and Sagyin marbles to be exposed on the Maidan throughout the rains in order to see what effect, if any, is produced upon them.

I think that we should now proceed generally upon the hypothesis that Makrana marble will be used, unless subsequent tests or estimates show it to be unsuitable.

[*Enclosures to the foregoing letter.*]

1. Letter from Messrs. Martin & Co. and Messrs. Bird & Co., to the Hon'ble Mr. R. T. Greer, dated 11th April 1905.

2. Report by Mr. T. H. Holland, Director of the Geological Survey, on the occurrences of marble at Makrana, dated 26th April 1905.

No. 100.

Telegram, dated 27th April 1905, 1-40 P.M.

From—Viceroy,

To—SIR W. EMERSON, Westminster, London.

Please suspend action until letter received.

No. 101.

Dated Simla, the 28th April 1905.

From—R. NATHAN, Esq, C.I.E., Private Secretary to the Viceroy,

To—The Hon'ble Mr. R. T. GREER, C.S.I, C.S., Chairman, Calcutta Corporation.

I have to thank you for your letter of the 14th April forwarding a letter from Messrs. Bird & Co. and Messrs. Martin & Co., stating that they are desirous of forming a Syndicate or Company for the purpose of opening out and developing the Indian marble fields and asking for an assurance that the Trustees of the Victoria Memorial Fund are prepared to consider favourably the supply of Indian marble to the Victoria Hall.

As you are aware, the question of the supply of Indian marble is now under consideration in consultation with Sir William Emerson.

No doubt you have suitably acknowledged the letter from Messrs. Bird & Co. and Messrs. Martin & Co.

No. 102.

Dated 28th April 1905.

From—SIR W. EMERSON, Kt., 2, Grosvenor Mansions, 76, Victoria Street, S. W.,

To—His Excellency the Viceroy.

Victoria Memorial, Calcutta.

I have the honour to acknowledge the receipt of Your Excellency's letter of April 6th, 1905, and will now reply as clearly and concisely as I can to the various points raised in both the letters, namely, March 16th and April 6th.

I do not find in the Minutes of the meeting of February 27th, 1905, what the modifications in the Clauses 11, 12, 14, 17, 18, and 20 of the draft Contract were. But Mr. Sevenoaks informs me it was decided to pass the marble in Greece. This I have always objected to, as it saddles the responsibility of the selection and accurate working of the stones on the Trustees instead of on the marble contractors, and it may be exceedingly difficult to obtain a sufficiently competent and trustworthy man who would necessarily be of the Clerk of Works class. This also would mean that, if inferior material and inaccurate workmanship were passed in Greece, it would have to be accepted in Calcutta and used in the best way we could instead of rejecting it.

Your Excellency informs me of the £5,000 retention money, which is right.

* * * * *

Third.—As to wastage being calculated on the Indian marble when on the site in Calcutta rather than on the cost at the quarries at Makrana, I have referred to this in my letter of April 7th, where I pointed out the great risk of doing so in regard to the setting out of the building which is most important and requires the most skilled foremen, and also as to the double cost involved in the contractor's staff.

Fourth.—As to building the Memorial partly of Grecian and partly of Indian marble. I do not think it would look well excepting in such a division as I long ago pointed out, which decided the Trustees in February 1904 to make a contract for Indian marble for the terraces and domes, and the rest in Pentelic. To build the lower half of the walls of one sort and the upper half of another would not do, for there is considerable difference in the colour and texture of the two marbles.

In my former letter, I quoted what had been told me as to the Mysore Palace. My informant was Mr. Colton, A. R. A., a sculptor, and therefore trustworthy.

Under Clause 12 of the draft Contract, the Marmor Company were only bound to "deliver 50,000 cubic feet and *such further quantities* as may be required by the Trustees," so that it would not necessarily involve the Trustees being bound to order more than the first 50,000 cubic feet. This clause might, however, have been better worded to remove any possible doubt.

Fifth.—As to Mr. Sevenoaks' remark that the marble would not be required till early next year. I have already explained that it is imperative that a large supply of marble should be ready to hand when work on the superstructure is commenced. It would take, I should think, a year to prepare such a quantity, which has been the reason of my urging from the very commencement that this marble question should be settled, and I greatly deplore the delay in doing so.

Sixth.—As to the cost of Indian marble put down by me at Rs. 4-3. I think my quotation of Rs. 4-3 for the first cost of winning the marble from Makrana will be found to fairly closely approximate to the average cost per cubic foot, and working it out at the figures named in Your Excellency's letter it comes to the same thing. I will explain as follows. Colonel Jennings' latest figures are:—

Rupees 2-0	per cubic foot for blocks of	1-15 cubic feet.
" 3-12	" " " " "	10-20 " "
" 4-3	" " " an average for	1-30 " " in size.

There will, however, be many considerably larger stones than 30 cubic feet in the heavier cornices, pediments, blocks, large caps, columns, and where constructionally necessary, and these larger stones will evidently be much more costly, seeing that Rs. 1-12 difference was quoted for only 5 feet increase of size from 15 to 20 cubic feet (a block 4' 0" × 4' 0" × 3' 0" is equal to 48 cubic feet, and that is not a very large stone).

Until the $\frac{1}{2}$ -inch scale details and construction are all drawn out and the Surveyors measure up the work, it is impossible for me or anyone else to tell the exact proportion of different sized stones required. I was, therefore, obliged to strike what I considered would be a fair average. I think there would be about as many stones of 15 to 20 cubic feet as of the smaller ones up to 15 cubic feet and many running from 25 to 50 and even 60 cubic feet.

Colonel Jennings' price of October 6th, 1904, of Rs. 4-3 was an average, I take it, of any size from 1 to 30 cubic feet as is clear from his telegram.

If, therefore, we deduct annas 4 for State duty and annas 2 for loading at Makrana, Rs. 3-13 is the price of the stone at the quarries; adding then annas 4 as an average per cubic foot for the increased cost of the stones larger than 30 cubic feet and annas 2 for contingencies, it brings it to the price I named Rs. 4-3, and I think annas 4 is a moderate estimate considering the large increase of price named for the difference between stones of 15 and 20 cubic feet.

This amounts to—

					Rs.	A.	P.
Cost of marble	...	...	...	...	4	3	0
Handling at Agra	...	...	...	...	0	2	0
Unloading and loading at Howrah	...	...	...	...	0	2	0
Carting and unloading at site	...	...	...	...	0	4	6
State duty	...	...	...	...	0	4	0
				Total	4	15	6
				The item of freight to Howrah	1	6	6
				... making a total of	6	6	0

as per my former estimate has now by Your Excellency's arrangements with the railways to be omitted thus somewhat reducing that estimate. In my former calculations I had a quotation of Rs. 4-8 for stones of 32 cubic feet which included loading at quarries and cartage to station and loading into wagons, but not State duties; deducting annas 12 for all these, including State duties, it brings it to Rs. 3-12, the same figure as Colonel Jennings' latest for stones up to 20 cubic feet. I also had a quotation of Rs. 2 for stones up to 10 cubic feet to which other costs had to be added.

Sir P. Playfair tells me the arrangement with the railways is that they should be allowed to transport the marble when their trains are convenient. I would point out that in that case delays might constantly arise, hindering the progress of the work.

I have no desire to use Greek marble, Belgian, Austrian or Italian all of which I have enquired about, in preference to Indian; on the contrary, if the Indian marble will stand in Calcutta and *cæteris paribus*, I would rather use it; it is a fine colour and texture. If Your Excellency and the Trustees will give me credit for absolute loyalty to their interests, and integrity of purpose, and a certain capacity for knowledge of what I am writing about, I should like to put to them the following points:—

- (a) We know there is plenty of marble in Makrana and Jodhpur.
- (b) It is uncertain how much inferior stone will have to be quarried before the hearts of the best beds are reached.
- (c) Until they are reached it cannot be ascertained if the marble is even then of the best quality, as it varies in all quarries: at Carrara they get stones out of the same quarry (Mr. Brock, R. A., the Sculptor, told me this) and side by side, some of which stand well and others go like sugar on exposure to the atmosphere here. The same thing, I understand, happens at Pentelikon:—
- (d) To supply something approaching 170,000 cubic feet, first-rate plant will have to be put down. Colonel Jennings' prices are for working it in the usual humdrum native fashion.
- (e) How long will all this take?
- (f) What time will then elapse before the stone can be won from the quarry?
- (g) After which comes the time occupied in working the marble.
- (h) The working of the marble at the quarries will, I think, be found impracticable.
- (i) When worked in India by new steam plant and by unaccustomed men will the work be good?
- (j) Will the Makrana marble stand in Calcutta?
- (k) Are contracts with Native States to be depended on?
- (l) Could the larger blocks required varying from 25 to 50 or 60 cubic feet and some few larger still be obtained from the Indian quarries, and what would the cost be?

These points are worthy of the most careful consideration by the Trustees before embarking on such an enterprise. It was all these considerations and the knowledge that the marble is ready in Greece with workshops on the spot, close to a port and another landing stage in Calcutta close to the site, which made me lean to Greece. I have given the best thought I am capable of to all these intricate questions which arise on the subject and so leave it in Your Excellency's and the Trustees' hands.

As I have over and over again pointed out, all these estimates can only be approximate till the quantities are finished and the contractor's prices attached thereto. But in all my estimates I have striven to allow sums that will cover the work, and that I have not been far out is proved by the first and second contracts, which are very close to my original estimates.

Seventh.—As to engaging an expert to report on the Makrana marble quarries. I can assure Your Excellency it was not necessary to ask me to help the Trustees as "loyally and efficaciously as I have done throughout," my

(b), (c), & (d).
If the Trustees
or Contractors
lay down the
plant and do the
quarrying, these
will have to be
added to the
cost per cubic
foot.

best endeavours are and always will be to work loyally solely in the interests of the Trustees.

If in any points I may differ from the conclusions arrived at by the Trustees, I can only say it is simply because I think I know more of the ins and outs of the difficulties of such a work as this. I shall immediately proceed on the lines indicated in Your Excellency's last letter and wire directly I have any information to give and will seek for such an expert as Your Excellency suggests. I think it should be a practical quarryman or foreman quarryman, who also is a mason. Anyhow I will take care it is someone entirely independent and not connected with other marble agents or quarry owners.

Mr. Sevenoaks has sent me a copy of his working out the cost of Indian marble, based on the order to be given for the terraces and domes only. These calculations are useless in connection with the main building, as the sizes of stones there are varied and entirely different. There will be also some large stones in the terraces not included in the quantities previously named as it was impossible to do so until the details were thought out, the quantity arranged to be ordered in February 1904 was only provisional.

P. S.—I have just received Your Excellency's wire—"Please suspend action until letter received." I have started an enquiry in one direction for an expert which will not matter and shall do nothing further till I hear again.

No. 103.

Dated 110, Cannon Street, London, E. C., 13th May 1905.

From—SIR PATRICK PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Since my arrival I have been making enquiries, independently of Sir William Emerson, for a suitable man to prospect the Indian quarries. I think my friend, Mr. F. W. Manuelle, might help us to find the class of man required, although he is very decided in the opinion, from his intimate knowledge with quarrying, that there are very few Managers whose opinion can be confidently relied upon; and that more disappointments arise in connection with quarrying than, perhaps, with any other industrial enterprise. I enclose a short and preliminary note of the conversations I have had with him.

I should like to know if His Excellency wishes me to prosecute such enquiries either independently or along with Sir William Emerson for the benefit of His Excellency and the Trustees. It seems to me that the subject requires close investigation, and the result of these enquiries will deserve the careful consideration of the Building Committee.

* * * * *

[ENCLOSURE TO THE ABOVE LETTER.]

Memorandum on an interview with Mr. F. W. Manuelle, on the subject of developing the Marble Quarries of India, and especially of Makrana, Rajputana.

Mr. F. W. Manuelle calls it a three-men's-job, to scientifically and practically explore the India marble quarries for the purpose of the Trustees; being the work of the Quarryman, the Scientist, and the Commercial man.

Mr. Manuelle has had large experience in quarrying for granite and stone. He has also large dealings in marble. He says for every quarry opened out to a profit, there are dozens of failures, and the money lost in opening out quarries believed to be sound, runs into hundreds of thousands of pounds during the last twenty years. He also states that it is most difficult to find an expert who would combine the qualifications of the Quarryman, the Scientist, and the Commercial man; that the number of first-rate Managers of Quarries can really be counted on the fingers of one's hand.

Mr. Manuelle throws out the most decided warning against attempting to open out quarries for any class of stone, and especially of marble, without thoroughly prospecting and testing not only the quality, but the supply of stone. The work of exploration always implies considerable outlay of capital, and takes time, because it is generally necessary to skin the earth and drill the rock. He cannot at present give an estimate of this cost without going into the matter more fully. This he has promised to do.

After considering the subject for a fortnight, Mr. Manuelle thinks he can find two men who might be trusted to carry out operations and report; one is at present a Manager of one of the marble quarries at Carrara, Italy.

From the information I have communicated to him, Mr. Manuelle seems to think (although he does not at present give it as his opinion) that it would be very costly, and certainly very risky, for the Trustees to attempt to open up and work quarries for the quantity of marble required for the Queen Victoria Memorial Building in Calcutta.

From his large and varied experience Mr. Manuelle seems to think that if the quarries prove to be serviceable after thorough exploration and investigation, it would probably be preferable to get a Syndicate to undertake the development of the industry, which might possibly be arranged if there be reasonable prospect of a permanent trade being established in the sale of Indian marble. He cannot see how it would pay to open out the quarries under any other conditions.

It must be understood that the foregoing are the first impressions formed by Mr. Manuelle who, however, will be prepared to go closely into the subject and advise me to the best of his ability, if the Trustees desire me to invite Mr. Manuelle to do so.

I have made enquiries elsewhere, and hope to get some further information placed at my disposal.

I meantime forward Mr. Manuelle's views, as I know him to be a practical and reliable man of standing in the city.

London, 10th May 1905.

(Sd.) P. FLAYFAIR.

No. 104.

Telegram, dated 15th May 1905.

From—SIR W. EMERSON, Kt.,

To—His Excellency the Viceroy.

Received letter. Report valuable *re* quantity. Syndicate possible solution for supply. Suggest obtaining tender, if acceptable making contract and commencing quarrying. Quite white marble not desirable. Blount thinks Makrana good weathering quality.

No. 105.

Dated Viceregal Lodge, Simla, 16th May 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—
 { H. H. SIR ANDREW FRASER, K.C.S.I., Lieut.-Governor of Bengal.
 The HON'BLE SIR FRANCIS MACLEAN, Kt., K.C., K.C.I.E. Chief Justice of Bengal.
 S. M. FRASER, Esq., C.I.E., Secretary to the Government of India, Foreign
 Department.
 The HON'BLE MR. R. T. GREER, C.S.I., Chairman of the Calcutta Corporation.
 The HON'BLE MR. A. A. APCAR, President of the Bengal Chamber of Commerce.
 SIR PATRICK PLAYFAIR, Kt., C.I.E.
 H. C. EGGAR, Esq.
 W. D. CRUICKSHANK, Esq., C.I.E.
 DR. E. DENISON ROSS.
 MAHARAJ-KUMAR PRODYOT COOMAR TAGORE.

I am desired by His Excellency the Viceroy to forward to each of the Victoria Memorial Trustees copies of the following correspondence :—

(1) Letter from the Viceroy to Sir W. Emerson dated 6th April 1905, in continuation of His Excellency's letter of 16th March, which has previously been circulated to the Trustees.

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(4) Letter from the Viceroy to Sir W. Emerson dated 27th April, in reply to the latter's letter of 7th April.

(5) Letter from Messrs. Bird and Martin to Mr. Greer dated 11th April, forwarded to Sir W. Emerson with (4).

(6) Report by Mr. T. H. Holland dated 26th April, concerning his visit to the Makrana quarries—also forwarded to Sir W. Emerson with (4).

(7) Letter and enclosures from Sir W. Emerson to the Viceroy dated 14th April, in continuation of his letter (2).

(8) Letter from Sir W. Emerson to the Viceroy dated 28th April, in reply to the Viceroy's letter of 6th April (1).

(9) Telegram from Sir W. Emerson to the Viceroy dated 15th May.

It will be observed from the concluding telegram that Sir W. Emerson, having studied Mr. Holland's most encouraging report, and having read the letter of Messrs. Bird and Martin, suggests obtaining a tender from that Syndicate. I am to ask you whether you concur in this proposal. The Viceroy will be glad to receive your opinion on this point, and also on any other subject arising out of the correspondence forwarded herewith. The sooner some action is now taken the better.

No. 106.

Dated 11, Russell Street, Calcutta, 23rd May 1905.

From—The HON'BLE MR. A. A. APOOR,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have received your letter of 16th May with its enclosures.

Mr. Holland's report is most encouraging. I think it would be more advantageous to the Trustees to negotiate with Messrs. Bird & Co., and Messrs. Martin & Co., for the supply of Makrana marble than to undertake the work on their own account.

If the Government of India can assist the Syndicate in obtaining the necessary concessions from the Jodhpur State it would greatly facilitate matters.

I would suggest that—

- (1) A copy of Mr. Holland's report be given to the Syndicate.
- (2) That the Syndicate be informed that Sir W. Emerson had been requested to select and send out a marble expert and that Sir William's services might be made available for them, if they so desire, in place of the marble expert they suggest bringing out in their letter of 11th April.
- (3) That certain special concessions had been given by the Jodhpur State in consideration of the marble being required for the purpose of the Victoria Memorial, that such concessions would apply to any marble the Syndicate might supply for that purpose and the Trustees would get the benefit of them in the price to be charged for such marble. These special concessions would not necessarily apply for any marble they may obtain from the quarries for other purposes.

No. 107.

Dated 2, Esplanade West, Calcutta, 25th May 1905.

From—W. D. CRUICKSHANK, Esq., C.I.E., Secretary and Treasurer, Bank of Bengal,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have received your letter of 16th instant, and enclosures.

Mr. Holland's report goes far to clear the way for the use of Indian marble. It appears to settle the questions of quantity and accessibility quite satisfactorily. Sir William Emerson's telegram of 15th instant is also satisfactory in giving promise of a favourable report as to the "weathering quality" of Makrana marble. There remains then only the question of cost to be considered, and I agree that the best way of settling it would be to obtain tenders for the supply of the finished article, from responsible contractors.

Mr. Manuelle throws out the most decided warning against attempting to open out quarries for any class of stone, and especially of marble, without thoroughly prospecting and testing not only the quality, but the supply of stone. The work of exploration always implies considerable outlay of capital, and takes time, because it is generally necessary to skin the earth and drill the rock. He cannot at present give an estimate of this cost without going into the matter more fully. This he has promised to do.

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I have made enquiries elsewhere, and hope to get some further information placed at my disposal.

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Two Calcutta firms have submitted a conditional offer to form a Syndicate or Company for the purpose of opening out and developing the Indian marble fields, quarrying the marble, and supplying it for the building of the Memorial Hall; and the Trustees are asked whether they concur in a proposal made by Sir William Emerson that a tender should be obtained from that Syndicate.

The two firms named are capable and responsible people. A tender from them might be accepted with confidence that it would be carried through, and I think that the assurance they desire, *viz.*, "that the Trustees are prepared to consider favourably the supply of Indian marble to the Victoria Hall" may be given. But the Syndicate are not at present in a position to make a tender, and they will not be in such a position until the conditions laid down in paragraphs 2 to 4 of their promoter's letter to Mr. Greer, dated 11th April 1905, have been fulfilled.

If this be so, I would respectfully suggest for His Excellency's consideration that the present position of the marble question be communicated to the two firms named, and that all available information regarding the Makrana marble supply, and mode of working, be placed at their disposal along with estimates to be prepared by the Superintending Architect of the quantity of marble required by certain specified dates within the next 18 or 24 months for building operations: also that, at the same time, the two firms be asked to submit either on their own behalf, or that of the Syndicate they contemplate promoting, but within a limited time, their proposals for meeting the requirements of the Trustees. These proposals should include separate estimates of the cost of the supply to be provided (1) before the working plant which they propose to import from Europe can be brought into use and (2) after the working plant has been set up.

As the two firms would have much to arrange in connection with (1) the formation and constitution of the Syndicate, (2) the concession to work the quarries, (3) the engagement of a marble expert (should this still be considered necessary) and (4) the importation of quarrying plant, it seems desirable that no time should be lost in communicating with them.

My idea is that pending a contract for the supply of the great bulk of the material required, it may be practicable to enter into a working arrangement with the two firms, under which the early requirements would be supplied and paid for at a reasonable percentage above cost price.

In making these suggestion I attach weight to the following extracts from Sir William Emerson's letters of 7th and 28th ultimo:—

1st.—7th April 1905.—"In regard to Mr. Sevenoaks' remark that the
"marble would not be required till about this time next year—
"this is true, but unless, by the time a contract for the super-
"structure is made, about a year's supply of marble is ready on
"the site in advance, there will be endless claims for delay,
"through no fault of theirs, on the part of the contractors
"whoever they may be."

2nd.—7th April 1905.—"Another point is arrangements to obtain
"Indian marble would take so much time that the work already
"done in the foundations would either deteriorate or require
"considerable outlay in maintenance."

3rd.—28th April 1905.—"As to Mr. Sevenoaks' remark that the
"marble would not be required till early next year, I have
"already explained that it is imperative that a large supply of
"marble should be ready at hand when work on the superstruc-
"ture is commenced. It would take, I should think, a year
"to prepare such a quantity, which has been the reason for my
"urging from the very commencement that this marble question
"should be settled, and I greatly deplore the delay in doing so."

No. 109.

Dated Darjeeling, 26th May 1905.

From—H. H. SIR A. H. L. FRASER, K.C.S.I., Lieutenant-Governor of Bengal,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

With reference to your letter of 16th instant, I write to say that the proposal made in Sir W. Emerson's telegram of 15th instant seems to me quite sound. I think that a tender should be obtained from Messrs. Bird and Martin's Syndicate.

No. 110.

Dated 110, Cannon Street, London, E. C., 26th May 1905.

From—SIR PATRICK PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

In continuation of my letter of the 12th instant, my friend, Mr. F. W. Manuelle, has discussed the exploration of the marble quarries of India with his friends, Messrs. Fenning & Co. of Cannon Street, E. C., who are large dealers in marble and granite. This firm lately constructed the new building for the Baltic in St. Mary Axe, the interior of which is composed of marble.

This firm considers their representative at Carrara, who has been in their service resident there for 8 or 9 years, would be the very best man to make the exploration. His name is Mr. Voigt; 28 years of age; an Englishman, and gentleman by birth and in manners; a recognised expert in every quality of marble with the experience of the quarryman. Mr. Voigt has therefore practical knowledge, and is, in the opinion of Mr. Manuelle and Mr. Fenning, a suitable man to make a preliminary investigation. He would, of course, be supported by an efficient staff, in the selection of which they consider he should be consulted.

Mr. Voigt is at Carrara and is willing to come to England to discuss the whole question including terms.

My object in writing to you to-day is to enquire whether His Excellency would approve of Mr. Voigt being called from Italy to see me, and whether His Excellency desires me to discuss terms with Mr. Voigt and with Messrs. Manuelle and Fenning.

I have not spoken to Sir William Emerson with regard to Messrs. Fenning and Voigt, and, if they conduct the investigation they desire, I understand that competitors in the trade should not meanwhile know of it. You will perhaps therefore kindly give respect to this.

Mr. Manuelle has discussed the proposal with Messrs. Fenning & Co. as a scheme that might lead to the opening up of the Indian quarries under a favourable concession given to a Syndicate or Company to work the quarries, in which Messrs. Manuelle and Fenning might become permanently interested.

The cost of the preliminary exploration would be met, at all events in the first instance, by the Trustees, and it might be matter for future arrangement how these expenses should be apportioned when a Syndicate is formed.

It is quite possible that Mr. Manuelle himself might be induced to visit India and the Indian quarries during the cold weather if the first impressions formed by Mr. Voigt were favourable. It seems to me that this would be a distinct advantage.

His Excellency, I feel confidence in saying, would find Mr. Manuelle a practical and first-rate business man.

At present, and without coming to close quarters with Mr. Voigt, Mr. Manuelle cannot say what remuneration Mr. Voigt would require. He thinks a period of at least 6 months, during favourable weather, would be required to investigate the Makrana quarries, and, as Mr. Voigt would be relinquishing employment in Europe to go to India, he might require £1,200 to £2,000. But Mr. Manuelle cannot at present say anything more.

I do not propose that Mr. Manuelle should call Mr. Voigt from Italy until I have the authority of His Excellency to discuss the matter with him, neither do I wish Mr. Manuelle to misunderstand my position or disappoint his friends, Messrs. Fenning & Co.

I shall, therefore, feel much obliged if you can see your way, on receipt of this letter, to send me a cablegram informing me whether His Excellency

wishes me to proceed further in this matter with these gentlemen; and whether His Excellency wishes me to do so in consultation with Sir William Emerson or not.

If I am authorised to discuss the matter, I shall report fully for His Excellency's information the views Mr. Manuelle, Messrs. Fenning & Co., and Mr. Voigt may express in conference.

No. 111.

Dated Darjeeling, 26th May 1905.

From—The Hon'ble Mr. R. T. GREER, C.S.I., Chairman of the Calcutta Corporation,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have received your printed letter of the 16th instant, and accompanying correspondence regarding the Victoria Memorial, and asking whether I concur in the proposal that the Trustees should obtain from Messrs. Bird & Co. and Martin & Co. a tender for the supply of Indian marble for the Memorial.

Before the issue of their letter of the 11th April (marked number 5 of the correspondence) I had discussed the subject at considerable length with the representatives of these Firms, especially as to the opportunity which existed for the opening out and development of the Indian marble fields. Considering the proceedings of the Trustees to be confidential, I could do little more than express my own views in the matter.

As you are aware, the Trustees at that time had only vague information as regards the Makrana marble fields and the possibility of working these quarries on a large scale at any reasonable cost.

Messrs. Bird & Co. and Martin & Co. were then ready to invest a considerable sum of money in order to satisfy themselves as to the quality and quantity of the marble and their ability to meet the requirements of the Trustees. They desired, however, to have an assurance that the Trustees had not already committed themselves to the purchase of Greek marble, and that they would be inclined to favourably consider a proposal for the supply of Makrana marble. They mentioned, in the course of the discussion, their willingness to tender for the supply of Greek marble, in case the Trustees decided against the Indian material. At that time they did not possess sufficient information to enable them to submit a tender and were not prepared to do so.

I am at present in Darjeeling, under medical treatment, and therefore unable to see these gentlemen in Calcutta and find out if they are now in a better position to tender. The report of the Director of the Geological Survey, dated the 26th April (number 6 of the correspondence), supplies new and most valuable information, and, apparently, settles all questions regarding the quantity of the Makrana marble and the possible speed of delivery. The Trustees, accepting Mr. Holland's conclusions, are now in a position to call for definite information as to the cost of this marble delivered at Calcutta.

The Marmor Company were able to make a firm offer for the supply of marble, and, therefore, the necessary information must be available for this purpose, otherwise, I would expect that a definite tender could not be given, until more exact details are supplied regarding the size and shape of the various blocks.

I recommend that a copy of Mr. Holland's report be sent to Messrs. Bird & Co. and Martin & Co. with full information concerning the time limit for delivery and the concessions in Rajputana and on the railways, with the intimation that the Trustees propose to call for tenders for the supply of Makrana marble. I am of opinion that a public notice should be given in India and England of the intention of the Trustees to consider tenders for the supply of this marble. Contractors would thus be able, without loss of time, to set about collecting information regarding machinery, labour and other details connected with the undertaking.

It is satisfactory to find reliable firms in India prepared to carry out this work. The necessary security against untrustworthy contractors would be assured in dealing with Messrs. Bird & Co. and Martin & Co., the proposed Syndicate.

As a protection to the Trustees against any possible miscalculation of the tenderers, it is desirable that Sir William Emerson's practical quarryman should examine and report on the Makrana quarries, and that the results of his enquiries should be placed at the disposal of the tenderers to be considered by the Trustees together with the tenders.

No. 112.

Dated 110, Cannon Street, London, E.C., 2nd June 1905.

From—SIR PATRICK PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

* * * * *

During the week I have had the chance to find a Mining Company, with capital seeking investment, that might be willing to consider the development of the marble quarries of Rajputana, and would be willing to work in conjunction with Mr. Manuelle, probably favouring such a coalition. I have not yet mentioned this to Mr. Manuelle. I allude to it as another possible string to our bow, as I have some influence with the Chairman of the Company.

You will please understand from my letter last week that I do not proceed with negotiations with anyone, in other words I do nothing, without the sanction of His Excellency, which you will perhaps be pleased to communicate to me by telegram if His Excellency wishes me to follow these up, seeing that attendance of representative men in the City becomes fitful towards the end of next month.

No. 113.

Dated 2, Grosvenor Mansions, 76, Victoria Street, S. W., 2nd June 1905.

From—SIR W. EMERSON, Kt.,

To—His Excellency the Viceroy.

Victoria Memorial, Calcutta.

I showed Mr. Blount Dr. Holland's report, in reference to his remarks on Mr. Blount's test.

He writes to me as follows:—

“Dr. Holland refers to my remarks on the coarseness of grain of the marble, but in my report no reference is made to any peculiarity of the kind. I conclude that some misunderstanding has occurred, which may be referred to Dr. Holland for elucidation.”

I thought it well to forward Your Excellency this.

No. 114.

Dated Calcutta, 3rd June 1905.

From—The HON'BLE SIR F. W. MACLEAN, Kt., K.C., K.C.I.E., Chief Justice, High Court, Bengal,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

In reply to yours of the 16th May I write to say that I concur in the proposal that a tender should be obtained from Messrs. Bird and Martin's Syndicate for the marble for the Victoria Memorial Hall. And for my own part I think it would be a good thing if the same Syndicate would, later on, made a tender for the erection of the building itself, so that the Trustees may have, practically, one contract for the whole building. This would obviate some of the risks of separate contracts pointed out by Sir William Emerson in his letter of the 7th April of this year.

No. 115.

Dated Simla, 5th June 1905.

From—S. M. FRASER, Esq., C.I.E., Offg. Secretary to the Government of India, Foreign Department.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have carefully studied the correspondence connected with the Victoria Memorial which was forwarded with your letter of 16th May. I agree with the conclusion stated in His Excellency's letter of 27th April to the address of Sir. W. Emerson that Mr. Holland's report on the Makrana marble answers

many of the doubts expressed by Sir. William, and I concur in the proposal that a tender should at once be invited from the Syndicate which Messrs. Bird & Company and Messrs. Martin & Company are prepared to form.

Mr. Holland's report appears to be sufficient to satisfy the Trustees that there is a reasonable chance of success in trusting the Makrana quarries for the whole supply of the material required, and in view of the terms of the letter from Messrs. Bird & Company and Messrs. Martin & Company it will now, I suppose, be left to the Syndicate to bring out the marble expert.

No. 116.

Telegram, dated 6th June 1905.

From—DR. E. DENISON ROSS,

To—Private Secretary to Viceroy.

I concur in proposal to obtain tender from Bird and Martin's Syndicate.

No. 117.

Dated Tagore Castle, Calcutta, 7th June 1905.

From—MAHARAJ-KUMAR PRODYOT COOMAR TAGORE, Trustee, Victoria Memorial,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have carefully considered the papers connected with the proposed supply of Indian marble for the Victoria Memorial Hall. I beg you to convey my respectful apologies to His Excellency the Viceroy for the delay which has occurred in recording my opinion.

There is a general feeling both among the subscribers and the Trustees that Indian marble should be used, and I also, after due consideration, bow to His Excellency's decision.

I notice that Messrs. Bird & Co. and Messrs. Martin & Co. have proposed to form a Syndicate for the purpose of opening out and developing the Indian marble fields, quarrying the marble, and supplying the same to the Trustees for the building of the Memorial Hall; and I am glad to learn from Mr. Hollands's report that there are sufficient resources in Indian marble to meet all the requirements of the Victoria Memorial Hall. Sir William Emerson, who has fully studied this report, suggests that a tender be obtained from the Syndicate to be formed by Messrs. Bird and Martin. I fully concur in this proposal, and am decidedly of opinion that a tender should be called for without delay.

I forward to you the enclosed letter I have received from Messrs. Gladstone Wyllie & Co., and I beg you to submit this for the perusal of His Excellency the Viceroy.

With kindest regards.

[Enclosure to the above letter.]

Dated Calcutta, the 29th May 1905.

From—MESSRS. GLADSTONE WYLLIE & Co.,

To—The MAHARAJ-KUMAR PRODYOT COOMAR TAGORE, Calcutta.

We now have to report to you that we have made an extensive search for marble in India, but have been unsuccessful in finding anything in *pure* white, and any of such quality as would be suitable for a building such as the Victoria Memorial Hall, it is more or less uneven in colour, and has many faults in the grain, with imperfect specks, and in addition to this with very few exceptions is very porous, and this, as you are possibly aware, is a very serious defect.

We have not tried the "Jodhpur-Bikanir" Districts where "Makrana" marble comes from, as this place has already been extensively surveyed by Government, and it is a useless expense to go there as we could tell you nothing more than what is already known.

We hear of several Marble Syndicates talked about in the districts we have been, but we scarcely think they will start without a "Government guarantee" and even with this, if they decide to form and start, the delay will be very great.

So far we have found nothing so pure, hard, and white, as the *Burmese marble* we quoted the Committee for some time ago, and if the Architect, Mr. Sevenoaks, will break the piece we sent him, which is a piece that has for many years been exposed to all weathers, he will find it does not contain moisture and is perfect in all respects notwithstanding it was rough and unpolished. We are expecting daily to receive some blocks from Burma, which we shall cut and polish, and submit to the Committee, and feel sure they will be unable to find any marble to compare with it, and are quite certain it will come out almost, if not *the best*, in any moisture test it is put to.

Our freight is calculated pretty low, but we have no doubt the Agents of the steamers of the British India Company would meet Government by reducing to actual expenses if asked to do so.

As regards deliveries, we can of course deliver in blocks of any size, and any quantity, if due notice of requirements is given.

The Geological Department know the Burma marble well, and we think will bear us out as to its quality.

We have obtained from Paris full particulars of diamond-cutting saws and plant which can be worked very easily by either steam or electrical power, and these we have handed over to Mr. Sevenoaks for his information.

No. 118.

Dated Viceregal Lodge, Simla, 8th June 1905.

From—His Excellency the Viceroy,

To—SIR W. EMERSON, Kt.

As soon as I received your telegram I entered into immediate communication with the Trustees and invited their consent to obtaining tenders as suggested.

Their replies are dribbling in, and I hope next week to send you a copy of the orders that I shall issue on the subject.

Sevenoaks sent my Private Secretary a letter in which you mentioned the idea of coming out this next winter. If we have made a contract in the interval I think that it would be very desirable: and I agree that *after* the Prince's visit would be better than during it. In other words any time after middle of January.

However, we are not quite in a position to settle this definitely at present.

No. 119.

Dated 80, Dalhousie Square, Calcutta, 12th June 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

I have carefully considered the correspondence circulated with your letter of the 16th May. I waited until I should obtain a copy of Sir William Emerson's letter of the 19th May confirming his telegram of the 15th idem. This I obtained from Mr. Sevenoaks after the receipt of your telegram of the 5th instant. I am glad I waited, for, as I anticipated from the wording of the telegram, the confirmatory letter, as I think, shows Sir William Emerson to be mistaken on certain practical points of importance, to which, consequently, it is necessary I should refer. There is much to be foreseen, and all ill-considered opinion in a matter of such magnitude would not only be useless, but positively dangerous.

The Trustees are called upon to decide whether tenders should be invited for the supply of Makrana marble. They have before them the following documents:—

- (1) A joint letter of the 11th April 1905 from Messrs. Bird & Co. and Messrs. Martin & Co.
- (2) The report of Mr. T. H. Holland, Director of the Geological Survey of India.
- (3) A telegram of the 15th May 1905 and a letter of the 19th idem from Sir William Emerson.

Mr. Holland has reported upon the quality, quantity, and colour of the Makrana marble, and the means and expense of procuring it.

As to quality,—Mr. Holland in his report writes under reserve on the question of quality, and states that he prefers to leave a definite statement until the tests which he has arranged are complete. Samples of Makrana marble were subjected in England to severe scientific and mechanical tests, and were reported upon by Mr. Bertram Blount and, I think, by others. Mr. Holland says that he understands from Mr. Blount's report that he

(Mr. Blount) considers the coarseness of grain to be a sign of inferiority, but that he (Mr. Holland) holds that the coarseness of grain is a characteristic from which he would expect the Indian marbles generally to be able to resist the weather better and to be stronger than most of the marbles from Italy and Greece. Mr. Holland arrives at the conclusion in regard to Makrana marble, "that there are at present reasons for assuming that the materials used will be as lasting as material imported from Europe when exposed to the climate of Lower Bengal." It appears from Sir William Emerson's letter of the 19th May that he had again referred to Mr. Blount asking him to look over the tests he made and to say if he thought Makrana marble would stand the atmosphere of Calcutta. Mr. Blount's reply was as follows:—"I have referred to my report on Indian marble and find that the material behaved well under rather drastic tests. I consider it capable of resisting all ordinary weathering conditions." Sir William Emerson's comment on this is (letter 19th May,—"I think this settles an important point." Mr. Holland's opinion appears to cover the whole ground on the question of quality, that is, the dual requirement of strength as a material capable of bearing pressure and of ability to resist atmospheric changes. Possibly the one naturally follows from the other and distinction is unnecessary. According to Mr. Holland, more precise conclusions will be possible on these points of quality after the completion of his tests. It will be extremely interesting to know the result of the further tests to be applied, but progress need not, I think, be deferred to await such result, for the tests will be reported on before the time when, according to my estimate, tenders for the supply will be considered by the Trustees.

As to quantity,—Mr. Holland dismisses the question of the capability of the Makrana quarries to yield the required quantity with the remark (paragraph 9 of his report) that "the relation between the total quantity required for the Memorial Hall and the total resources of the Makrana deposits is obviously one that is not worth further discussion." Sir William Emerson has accepted this conclusion, for on the 15th May he telegraphed—"Report valuable *re* quantity", and in his letter of the 19th May he wrote—"Doctor Holland's report is valuable as to the quantity of marble obtainable which corroborates what Mr. Sevenoaks reported." Mr. Holland has taken the quantity required at 170,000 cubic feet, that is, the 150,000 cubic feet for the main building, which, according to now abandoned considerations, was to be obtained from Greece, *plus* the 20,000 cubic feet which was to be obtained in India for the domes. In a separate letter of the 19th May to Mr. Sevenoaks, in reference to the contract which, as I think, he mistakenly regards as almost immediately possible, Sir William Emerson writes—"With regard to any supply from Makrana such a contract should be for any quantity that may be required, say, from 50,000 cubic feet to 200,000 cubic feet, this will allow sufficient margin for any errors in our rough quantities." But evidently there is no danger of this increased requirement of 30,000 cubic feet exhausting the supply, for according to Mr. Holland (paragraph 8 of his report) ".....the quantity marketable would be 2,376,000 cubic feet or enough white marble to build a dozen structures of the size of the Victoria Memorial Hall." In my opinion the Trustees will be justified in concluding upon the opinion of Mr. Holland supported by calculations as in his report, that the supply of marble at Makrana is for their purposes practically unlimited. Whether in this enormous yield there is a sufficient quantity of marble of a uniform colour or tint is another question.

As to colour, that is, the ability of the Makrana quarries to yield a sufficient quantity of marble of a uniform colour or tint. In the negotiations with the Marmor Company it was stipulated (Clause 8 of the draft Agreement) that the marble to be supplied should "be free from iron pyrites, flaws, vents, shakes, or other defects or very large dark or colour spots or patches, save that marble with veins of a small degree of blue colour would be acceptable." Thus the marble was to be white with a latitude as regards variation from white to white with veins of a small degree of blue colour. His Excellency in his letter of the 27th April to Sir William Emerson, enclosing a copy of Mr. Holland's report, wrote:—"One important point is whether you wish the Hall to be built of pure white or of streaked and bluish marble," and the telegraphic reply was—"Quite white marble not desirable." In his letter of

the 19th May Sir William Emerson wrote in confirmation of his telegram—“As to pure white marble..... I do not want it quite white, veins and splashes of not too dark a blue or grey will be advantageous, and I propose using for the 3” bonding, stones picked with a good amount of grey or blue in them. Of course there must not be too much grey or blue, only enough to tone the white. The small samples shown of best white marble from Pentelic were almost pure white, but the bulk had clouded grey and blue streaks and patches, and some is quite strong bluish grey.” Thus what is required is white marble with veins or splashes of grey or blue sufficient only to tone the white. Marble of this description of colour will be required for the whole of the building with the exception of the bonding stones which are to be of a more pronounced variation. I understand bonding stones to be marble three inches in thickness placed at right angles to and between each band of facing stones for the purpose of support. These bonding stones are to be of a darker colour, so that it would seem to be the intention that the bonding stones are to show by contrast in colour as ribs or bands round the building and domes. Mr. Holland gives a graphic description of the quarries in the three ridges of hills at Makrana which he distinguishes as the eastern, the central, and the western ridges. The western ridge is worked for a pale grey marble and yields no white marble. In the eastern and central ridges bands of pure white marble alternate with uniformly grey and grey-streaked varieties. The beds exposed in the quarries immediately south of the railway show thicknesses of marble wholly or mostly white between beds of grey and grey-streaked varieties. Mr. Holland writes—“It would be safe, I think, to assume that in any of these quarries a total thickness of 20 feet of practically pure white marble can be obtained, whilst grey and streaked varieties form the rest of the ridge.” He sums up his conclusions by remarking that “there are sufficient resources in white and grey-streaked marble to meet all the requirements of the Victoria Memorial Hall.” I feel some doubt as to whether Mr. Holland and Sir William Emerson are at one with regard to colour, and whether the grey and grey-streaked varieties mentioned by Mr. Holland fulfil the requirement of white marble with veins or splashes of grey or blue sufficient only to tone the white. This seems to me a matter of the greatest importance, for, if the variegations are slight only, they will be acceptable; while, if they are too pronounced, it is immaterial what quantity of marble is obtainable, for, save perhaps for bonding stones, it will be useless for the purposes of the Victoria Memorial, and employment of Makrana marble will be impossible. The draft of the Contract with the Marmor Company contained a clause that “the contractors shall exercise the greatest care in the selection of the marble to be supplied to them, and the marble selected shall be equal to samples selected by the Architect.” A like provision will be necessary in a contract in regard to Makrana marble. The exhibition of samples should not be deferred until the making of the contract, but before inviting tenders Sir William Emerson should be asked to make definite selections of what he requires (the requirement rests with him) from representative samples, that they may be open to inspection of persons desirous of tendering, as in making their estimates, it is essential in their interests that they should know the requirement as to colour, and in the interests of the Trustees also, since the tenders will, as to amount, be affected by the position in the quarries of marble of the selected colour, that is, whether it is easy or difficult to procure.

As to the means and expense of procuring the marble. I feel the Trustees are indebted to Mr. Holland for the careful enquiries he has made and the pains he has taken to obtain all that is available by way of information on this question. The information contained in his report will afford valuable assistance to the Trustees, when the time arrives, to consider the tenders. As tenders are to be invited, this question does not appear to me to call for immediate consideration.

I turn to the joint letter of the 11th April from Messrs. Bird & Co. and Martin & Co. to discuss what they propose. They state—

(1) that they are desirous of forming a Syndicate or Company for the purpose.

(a) of opening out and developing the Indian marble fields,

- (b) of quarrying the marble, and
- (c) of supplying the marble to the Trustees for the Memorial Hall;
- (2) that they are prepared [on learning that the Trustees are inclined favourably to consider their proposals—and in the event of their (the Syndicate) being able to obtain the necessary concessions]
 - (a) to work the quarries,
 - (b) to go to the initial expense of bringing out a marble expert to examine and report on such deposits as are at present known with the object of ascertaining whether the quarries are of sufficient extent to supply the required quantity of marble;
- (3) that they are further prepared (in the event of their expert's report being satisfactory and such as will justify their proceeding further in the matter.)
 - (a) to submit a tender to the Trustees for the delivery of the marble in trucks at the quarries or at the nearest station thereto,
 - (b) to bring out a complete working plant;
- (4) that the object of their letter is to ascertain whether the Trustees can give them (Bird-Martin combination) their assurance that they are prepared to consider favourably the supply of Indian marble.

Their proposals are not stated in the natural order of events, but it will be observed that such proposals are confined to quarrying the marble and delivering it in rough blocks on rail at Makrana. If such proposals should be accepted, it would remain for the Trustees either to provide a staff of competent workmen to cut and work the marble in Calcutta, or to employ other contractors for such work, even to the cutting of facing stones from the rough blocks.

Before considering the Bird-Martin proposals and Mr. Holland's reports Sir William Emerson had estimated that it would take a year to get the expert's reports and for the Trustees to arrive at a conclusion upon them, another year to lay down plant and commence quarrying, and still another year to get a sufficient supply to keep the building going. On the 15th May Sir William Emerson telegraphed—"Syndicate possible solution for supply. Suggest obtaining tender. If acceptable, making contract and commencing quarrying." In his letter of the 19th May confirming his telegram he wrote—"Messrs. Bird and Martin's offer to form a Syndicate for working the marble seems really a way out of the difficulty of obtaining a supply. The suggestion in my telegram, that, if a tender by a Syndicate be found acceptable, a contract should be immediately entered into and quarrying commenced, was made in order to get a quantity of material ready this year. Were this done, I could send out, immediately on hearing from Your Excellency, particulars of a number of stones that might be prepared ready for commencing work in the superstructure next season." Writing also to Mr. Sevenoaks on the same date Sir William Emerson said—"Anyhow whatever arrangement or concession is arrived at, if it is to come to anything, it should be done at once, so that quarrying should be commenced shortly, and at any rate the facing stones and bonders should be prepared, so that there need be no hindrance of the superstructure being commenced early next year." Sir William Emerson is evidently under the impression that a Syndicate has already been formed, that such Syndicate are prepared to make a tender at once for the supply of marble according to specification, and that, if the tender should be accepted, a contract is immediately possible. He wrote to His Excellency on the 19th May—"I have written to Mr. Sevenoaks as to details of contract which he and Mr. Eggar could arrange if a tender is accepted and an arrangement come to with a Syndicate." And on the same date he wrote to Mr. Sevenoaks—"I think if they can make a contract with such a Syndicate it would get us out of a difficulty that has hitherto hampered us with regard to any supply from Makrana. Of course the points as to delivery, quality, and rejection should be similar to those which were arranged in the draft contract for the Marmor Company. This you and Mr. Eggar could do quite easily; it need only be a short contract."

I cannot understand what can have led Sir William Emerson so much beyond the position as it appears on the correspondence. In the first place

the Syndicate has not been formed, and the formation is dependent on the assurance to be given by the Trustees that they are prepared to consider favourably the proposals made. In the second place the undertaking contemplated by Messrs. Bird and Martin consists in the quarrying of marble and its delivery in blocks on rail at Makrana, and not in the delivering of marble worked according to specification at the site in Calcutta. In the third place two conditions precede the making of a tender by the Syndicate when formed, (a) the obtaining of concessions from the Native State, and (b) the satisfactory report of the expert employed by the Syndicate justifying them in proceeding to a tender. And, in the fourth place, the contract, as to delivery and rejection and in other respects, would be different from the Marmor contract, and the materials for a contract do not yet exist.

When Messrs. Bird and Martin say that they are prepared to submit a tender, they do not mean that they have all the materials and details for a tender ready; they mean that, if they consider they are justified in proceeding, they will make the necessary enquiries and calculations for a tender to be submitted in due course. They might be satisfied with Mr. Holland's report as to the quantity of marble, but their enquiries and calculations would extend far beyond anything that is contained in that report. Sir William Emerson in his letter of the 19th May to Mr. Sevenoaks wrote—"You had better speak to Messrs. Martin and tell Mr. Mookerjee" (partner in that firm) "that they had better look into details, so as to be ready, should His Excellency ask them for a tender." This, in my opinion, was not advisable, for it was calculated to lead Messrs. Martin & Co. to consider from Mr. Sevenoaks' visit that the Trustees were "inclined favourably" to their proposals. Mr. Sevenoaks, according to these instructions, called upon Messrs. Martin & Co., who informed him that, even if all conditions were complied with, it would be impossible for them to submit a tender for the work proposed under at least six months from the time of commencing enquiries.

In your letter of the 16th May you refer to Sir William Emerson's suggestion that a tender should be obtained from the Syndicate, and ask whether I concur in this proposal. I am regretfully obliged to answer this question in the negative, for the reason that, under the forestated circumstances, the obtaining of a tender from the Bird-Martin combination is not at present practicable, and for other reasons which I am about to explain.

Apart from what I have written on the subject of the Bird-Martin proposals, I consider it desirable in the interests and for the protection of the Trustees, and certainly, if public opinion is to be regarded, that the contract for the supply of Makrana marble and the contract for the superstructure should be thrown open to competition, and advertisements should be published calling for tenders. For some good reason that I cannot now remember, the contract for the foundations was made with Messrs. Martin & Co., without advertisement. They were given the further contract for the footings because it was intimately connected with the contract for the foundations and was treated as an extension of that contract. The question of publicly calling for tenders has been discussed at meetings of the Trustees, and my impression is that the advisability of advertising for tenders for the work in the superstructure has been recognised. In my opinion the adoption of this course in regard to the contract for the supply of marble will not retard, but, on the contrary, will facilitate the proceedings of the Trustees.

Assuming the Bird-Martin proposals to be extended to working the marble according to specification, the Trustees will be under a disadvantage in considering their tender alone, as they will have nothing more than is contained in Mr. Holland's report and such advice as may be obtainable from the Public Works Department to guide them, and will consequently be too much at the mercy of the tenderers; whereas, if the Trustees advertise for tenders, they will be able to contrast the tenders, and be thereby greatly aided in checking them and in selecting whichever appears to them the most favourable. Messrs. Bird & Co. and Messrs. Martin & Co. have not, nor has any firm in Calcutta, any special technical knowledge of quarrying and working marble. There are others who have expressed a desire to have an opportunity of tendering, for instance, Messrs. Burn & Co. If the contract for

the marble be entered into, without advertisement, with Messrs. Martin & Co., or any combination they may arrange, it will certainly be considered as favouritism shown to that firm. I write this advisedly knowing the feeling that exists. I imagine there will be others, both in India and England, who will tender pursuant to advertisement; but, if none other than the Bird-Martin combination should tender, the Trustees will, by throwing the contract open to competition, have avoided all possible objection. It is quite within the range of probability that the Marmor Company may be one of the tenderers. I have no foundation for this prediction beyond the fact that, in anticipation of the favourable conclusion of the now abandoned negotiations, they expended £10,000 in machinery which they have on their hands. Having special technical knowledge of all matters connected with the quarrying of marble, and having their experts and skilled workmen available, they may consider it worth their while to tender, and the possession of the requisite machinery may give them an advantage over other competitors, to the benefit of the Trustees who would possibly obtain from them a lower estimate.

Now in my opinion the course to be adopted is—

- (1) that the Trustees should themselves obtain a concession from the Native State,
- (2) that the Architect be asked to make his selection of samples from such Makrana marble as he may already have or as may be obtained and sent to him for the purpose,
- (3) that the Architect be asked to prepare and have in readiness for inspection such specifications and drawings as are sufficient to afford the information necessary to applicants desirous of tendering,
- (4) that advertisements be published inviting tenders for the whole of the work of quarrying and getting from the conceded quarries, of working, moulding, carving, and shaping according to specifications and drawings to be furnished by the Architect, and of supplying to the Trustees in Calcutta all such Makrana marble as may from time to time be required for the building,
- (5) that on the date fixed by the advertisement the Trustees, or the Building Committee, proceed to the consideration of the tenders, and
- (6) that, if the Trustees decide on accepting any tender, that a contract be entered into with the successful tenderer.

Messrs. Bird and Martin, in their letter of the 11th April, stated they were ("would be") prepared, in the event of their being able to obtain the necessary concession to work the quarries, to do what they proposed. They place the obtaining of the concession almost as a first condition precedent to their submitting a tender. I do not suggest that this condition was stated with selfish or improper motive; on the contrary, I understand it to mean merely that, assuming all arrangements and facilities are made and afforded for working the quarries, they will be prepared to act. But the Trustees have to guard against possibilities, and, in their interests, I consider it most undesirable to allow any intending tenderer or any contractor to obtain a concession. A concession granted to an intending tenderer would give him an undue advantage. No one can say what intentions may not arise from the competition which it is to the interests of the Trustees to create. Holding the concession, an intending tenderer would be in a position to baulk and possibly exclude other persons desirous of tendering, to his own advantage, and the detriment of the Trustees, and, he might, more directly, obtain an undesirable control in relation to the Trustees themselves. Further, to allow intending tenderers to apply for the concession would give rise to a competition of an opposite and sinister tendency amongst intending tenderers, of which the Native State, being naturally disposed to give the grant to the highest bidder, would take advantage. To allow a contractor to hold the concession would lead to serious complications, if it should become necessary for the Trustees to enforce the contract by employing other contractors in the event of default by the original contractor and holder of the concession. It should be borne in mind that if the contractor should obtain the concession the rent or royalties payable under it have,

indirectly, to be borne by the Trustees, as such payments will be included in the estimate or contract for the work. Therefore, it is desirable that the concession should be obtained by the Trustees; and in the advertisement for tenders it should be stated that a concession has been obtained, that a copy is open to inspection, and that the successful tenderer will have the advantage of the concession. The Native State may be influenced to grant a concession to the Trustees on more favourable terms than would be accorded to a tenderer or contractor. The negotiations with the Native State concerned have hitherto had reference to price upon the assumption that the State would contract (?) for the supply of marble, consequently, negotiations would have to be opened *de novo*. The question of the inability to enforce a contract against the Native State is not so important in regard to a concession as in regard to a contract to supply, and, if as I suggest they should be, the negotiations are influenced on behalf of the Trustees by the Government of India there will be sufficient security and no difficulty. The concession should be fair and reasonable as to rent or royalties, both as to their amount and their incidence. It should confer full liberty to quarry and get all marble required as to amount, quality and colour, and to make use of all means expedient for such purposes. It should provide for all necessary rights of way, and contain power to erect buildings for housing marble, machinery, and workmen and for workshops, and to construct railway sidings and approaches. It should be made determinable, by the Trustees only, on notice, when all marble required has been extracted and taken and buildings have been removed. The terms of the concession, as to the description of the area of land and in the other respects I have indicated, will require careful consideration to guard against any possibilities of such terms afterwards turning out to be insufficient.

As to samples,—this is a matter for the Architect. I do not know if the selection will be made by Sir William Emerson from such samples as he may already have in London or as may be sent to him to select from, or if, as in the draft of the Marmor Contract, it will be left to the contractors to obtain and exhibit samples to the Architect for approval. As the Makrana quarries will be at a greater distance from London than those of Pentelicus, I am disposed to think it will facilitate matters if the samples are selected by the Architect so as to be open to inspection to tenderers. They should be in duplicate (for London and Calcutta) and should be marked permanently by Sir William Emerson for identification.

As to drawings and specifications,—I understand that complete detail drawings will not be available until those for the superstructure are ready several months hence, but that it will be possible for Sir William Emerson, as presumably was the case in the negotiations with the Marmor Company, to have in readiness advance drawings of the several classes of work sufficient to afford all that is necessary in the way of information to tenderers. The specification, as in the case of the Marmor Company, will be general in terms. That attached to the draft of the Marmor Contract, with appropriate alterations, will probably be all that is immediately requisite. The specification should be approved by the Architect.

As to advertisement,—I enclose* with this a form of advertisement, a copy of which should be sent to Sir William Emerson for approval. When approved, with or without alteration, it should be published simultaneously in the English and Indian papers.

As to a contract,—I am unable at present to submit a draft. I await the acceptance by the Trustees of my suggestion that it should relate to the whole of the work in the quarrying preparation and transport of the marble.

When your further circular letter of the 12th June 1905 reached me I replied by telegram—

“Victoria Memorial. Your circular letter 12th instant. Cannot agree Trustees should give assurance to Syndicate. Would create worse difficulty. Position not understood by Emerson and Trustees. Am dealing with matter fully. Suggesting proper course, sending documents. Will also explain at meeting when convened by Chief Justice.”

In your letter also of the 12th June to Mr. Sevenoaks you wrote—“and the Trustees have unanimously approved the suggestion that a tender or tenders should now be invited.” As will have been seen I concur in this, save

in so far as it may from the context suggest that a tender should be invited from the Bird-Martin combination alone.

Taking the assurance asked for by Messrs. Bird and Martin to be of the general character indicated, the answer to their letter of the 11th April should, I think, be to the effect that the Trustees give "their assurance that they are prepared to consider favourably the supply of Indian marble to the Victoria Hall;" but they have decided to obtain a concession, and to invite tenders by advertisement for the whole of the work involved in the quarrying, working, preparation and transport of the marble.

Your letter states there are two points upon which His Excellency feels some doubt—

(1) Whether the contract for the supply of the marble should be distinct from the contract for the building?

(2) Whether it is desirable to confine the present negotiations to Messrs. Bird and Martin, or to invite public tenders?

I have dealt with the second of these questions in what I have already written.

His Excellency considers that the answer to the first question turns to some extent upon whether the contract under discussion is to be for the supply of the marble only, or for the construction of the building as well. The two classes of work are distinct in character—a distinction which would render the provisions of a combined contract complicated: but the practical and effectual barrier between them is the requirement as to time. Certainly no time, and I doubt if any trouble, will be saved by having only one contract for the combined work. I have considered the matter in all aspects that suggest themselves to my mind, and I do not see that any economy will result from the one contract. Comparing the two classes of work, I question if an unmixed advantage is to be anticipated from having the same contractor for both. I foresee that in inviting tenders for the combined work, the Trustees may be shutting out desirable tenderers for the supply of marble. The combined work could only be undertaken by a building contractor. True, disputes or claims for compensation might be avoided by employing one contractor for both sets of works, but to be forewarned is to be forearmed, and the two contracts, if separate, would contain protective provisions. But whatever may be said in favour of the employment of one contractor at the outset, is met by the inexorable barrier as to time. All previous communications point to the necessity for concluding a contract for the marble with all possible despatch, in order that the work may be at least one year in advance of the commencement of the work on the superstructure, and that marble may for the latter work be ready on the site as wanted. Tenders for the work on the superstructure cannot be invited until the drawings, quantities, and specifications for that work, for a long time in course of preparation, are completed, and these, I understand, will not be completed for some months. The one contract, therefore, necessarily precedes the other, and the blending of the two contracts would lead to great delay, and may create confusion. If having one contractor for the combined work be indeed an advantage, it is quite probable that the contractor for the supply of the marble may be the successful tenderer for the superstructure.

I think I have commented on all points raised by your letters and their enclosures.

No. 120.

Dated Viceregal Lodge, Simla, June 12th, 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To { The HON'BLE SIR FRANCIS MACLEAN, Kt., K.C.I.E., Chief Justice of Bengal.
The HON'BLE MR. A. A. APCAR, President of the Bengal Chamber of Commerce.
H. C. EGGAR, Esq.,
W. D. CRUICKSHANK, Esq., C.I.E.
DR. E. DENISON ROSS.
MAHARAJ-KUMAR PRODYOT COOMAR TAGORE.

I am desired by His Excellency the Viceroy to send you the accompanying copy of a letter* which I have sent to Mr. Sevenoaks and of its enclosure.

* Dated 12th June 1905, regarding the supply of Indian marble.

No. 121.

Dated Viceregal Lodge, Simla, June 12th, 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—R. L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial.

His Excellency the Viceroy has consulted the Trustees of the Victoria Memorial Hall with reference to the correspondence that has passed recently between Sir W. Emerson and himself, arising out of the offer of Messrs. Bird and Martin to form a Syndicate for the supply of Indian marble, and of the report of Dr. Holland on the Makrana quarries: and the Trustees have unanimously approved the suggestion that a tender or tenders should now be invited.

In connection with this subject I am to send you a copy of a further letter received by the Viceroy from Sir W. Emerson.

It now appears desirable that the letter of Messrs. Bird and Martin to Mr. Greer of April 11th last should be answered. The Trustees are in a position to give the assurance asked for in the concluding paragraph of that letter, and they are further prepared to place every facility in the way of Messrs. Bird and Martin, or any other firms who may be disposed to tender for the supply of the marble.

His Excellency authorises you accordingly, as soon as the occasion arises, to furnish the following assistance to Messrs. Bird and Martin :

- (1) Send them Dr. Holland's report.
- (2) Give them full information as to the concessions offered by the Jodhpur Durbar for the supply of marble (not for Indian purposes in general, but for the Victoria Memorial Hall).
- (3) Give them similar information about the railway concessions. Presumably the Rajputana-Malwa railway authorities will have to be addressed with a view to granting the same concessions as the East Indian Railway have already done.
- (4) Assure them of the full support of the Government of India in negotiating with the Jodhpur Durbar.
- (5) Give them all the information as regards the shape and dimensions of the stones contained in Sir W. Emerson's latest letter to the Viceroy and, presumably, in his correspondence with you.

You will observe that Sir W. Emerson says that there is now no necessity to send out an expert, since the contractors will employ their own competent quarry foreman.

There are two points about which His Excellency the Viceroy does not feel competent to form an opinion himself.

The first of these is whether the contract for the supply of the marble should be distinct from the contract for the building. No doubt it would be possible to make two contracts; but it would probably be a source of economy, and would save much time and trouble, to make one. His Excellency does not know if Sir W. Emerson has written anything to you on this point.

The second question is the desirability of confining the present negotiations to Messrs. Bird and Martin, or of inviting public tenders. The answer to this turns to some extent upon whether the contract now under discussion is to be for the supply of marble only or for the construction of the building as well.

The following Trustees are believed to be at present in Calcutta: The Chief Justice, Mr. Cruickshank, Mr. Apcar, Mr. Eggar, Dr. Ross, Maharaj-Kumar Tagore. His Excellency is instructing me to send a copy of this letter and enclosure to each of the above mentioned gentlemen; and he suggests that you should at once call upon the Chief Justice, and request him to be so good as to summon an informal meeting of the Trustees without delay to discuss the above points. The Viceroy will be quite prepared to accept their advice on the matter. It is most desirable to get to business at once, so as to allow ample time to the firm or firms who may be disposed to tender, and to provide, if possible, for the supply of the first consignment of marble on the site, when it is wanted next spring.

[Enclosure to the above letter.]

Dated 2, Grosvenor Mansions, 76, Victoria Street, S. W., May 19th, 1905.

From—SIR W. EMERSON, Kt.,

To—His Excellency the Viceroy.

Victoria Memorial, Calcutta.

I have to acknowledge the receipt of your letter and Doctor Holland's report, and letter from Messrs. Bird and Martin to Mr. Greer.

Doctor Holland's report is valuable as to the quantity of marble obtainable which corroborates what Mr. Sevenoaks reported, and also settles the question as to large blocks being obtainable, and the easy introduction of inexpensive plant for speedy working.

I asked Mr. Blount to look over the tests he made, and let me know if he thought Makrana marble would stand the atmosphere of Calcutta, and the following is a copy of his letter :—

"76/78, York Street, Westminster, S. W.,

May 3rd, 1905.

"DEAR SIR,

I have referred to my report on Indian marble and find that the material behaved well under rather drastic tests.

I consider it capable of resisting all ordinary weathering conditions.

Yours faithfully,

(Sd.) BERTRAM BLOUNT.

I think this settles an important point; it is not the wet particularly, but also the atmosphere of Calcutta, which seems impregnated like it is here with the impurities of a large town.

As to pure white marble, I mentioned to Your Excellency a long time ago that I do not want it quite white, veins and splashes of not too dark a blue or grey will be advantageous, and I propose using for the 3" bonding, stones picked with a good amount of grey or blue in them. Of course there must not be too much grey or blue, only enough to tone the white. The small samples shewn of best white marble from Pentelic were almost pure white, but the bulk has clouded grey and blue streaks and patches, and some is quite strong bluish grey.

Messrs. Bird and Martin's offer to form a Syndicate for working the marble seems really a way out of the difficulty of obtaining the supply.

I therefore cabled to Your Excellency on the 13th instant as follows :—

"Viceroy, Simla."

"Received letter; report valuable re quantity. Syndicate possible solution for supply. Suggest obtaining tender. If acceptable making contract, and commencing quarrying. Quite white marble not desirable. Blount thinks Makrana good weathering quality.—EMERSON."

I imagine Doctor Holland's estimate of cost quoted by an Agra firm of Rs. 6 as an all-round price for working and delivering the marble may be unreliable, as the quotations given by Colonel Jennings amount to Rs. 4, annas 3, for stones up to 30 cubic ft. this would allow only Re. 1, annas 13, for supplying the larger stones and working the more expensive details. But of course they had not seen the drawings, and would no doubt wish to reconsider such an offer. Anyhow it would become a matter of arrangement for the building contractors as to whether they could work it better by putting down steam plant at Calcutta, or Makrana, or perhaps sub-letting to such a firm as Doctor Holland mentions.

This might modify Messrs. Martin's estimates already given for working up the stones.

The suggestion in my telegram that, if a tender by a Syndicate be found acceptable, a contract should be immediately entered into and quarrying commenced, was made in order to get a quantity of material ready this year.

Were this done, I could send out immediately, on hearing from Your Excellency, particulars of a number of stones that might be prepared ready for commencing work in the superstructure early next season. I should have the quantities prepared by the surveyors in such a manner that, if doing all Your Excellency desires in marble comes out too much when estimates are obtained for the superstructure, then Sheorajpore, or Mirzapore, or Chunar stone can be substituted for certain portions of the work in the manner I have before indicated.

I sincerely hope some satisfactory arrangement may shortly be decided on, or I fear very great delay will ensue.

I do not see the slightest necessity for sending out an expert. Any contractors would naturally get their own competent quarry foreman, local labour or imported would be a question for them to decide if their tender were accepted.

Were a contract entered into with a Syndicate for the supply of marble, it should be, I think, for 3" facing 15" high, any lengths from 2' 0" to 4' 0" or thereabouts, and for 3" bluish bonders 8" on the bed, and of similar lengths, and for cubic stones from 1 to 15 ft., 15 to 20 ft., 20 to 30 ft., 30 to 40 ft., and for any larger sizes that may be requisite.

It should be for either pure white for panels or sculpture, and the facing to be mainly white with some veins and splashes of grey or blue.

I have written to Mr. Sevenoaks as to details of contract which he and Mr. Eggar could arrange if a tender is accepted, and an arrangement come to with a Syndicate.

No. 122.

Viceregal Lodge, Simla, June 14th, 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,
To—SIR PATRICK PLAYFAIR, Kt., C.I.E.

I am desired by the Viceroy to send you the accompanying correspondence, which will show you the stage which matters have reached in India, and will indicate that there is at present no necessity to decide about the visit of a marble expert to India.

In the above circumstances I sent the following telegram to you through your firm :

“Take no action. Letter follows.”

[ENCLOSURES TO THE ABOVE LETTER.]

- (1) Circular to the Trustees, dated 17th March 1905, and enclosures.
- (2) „ „ „ „ 16th May 1905, and enclosures.
- (3) Letter to Mr. Sevenoaks, dated 12th June 1905, and enclosure.

No. 123.

Dated 110, Cannon Street, London, E. C., 16th June 1905.

From—SIR PATRICK, PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I am in receipt of your circular letter, dated Simla, 16th ultimo, with copy of correspondence attached. I am also in receipt of your telegram, received through my Calcutta firm translating—

“The following telegram is from His Excellency the Viceroy.

“Memorial Hall. Do not act until you hear from me,”

to which I am giving attention.

I have had a long conversation today with Sir William Emerson, and I beg to be permitted to reply to your letter next week after I have had another opportunity of conferring with those experts in quarrying with whom I have been in communication. The Whitsun Holidays have interrupted business, and prevented an interview taking place this week.

No. 124.

Dated 2, Grosvenor Mansions, 76, Victoria Street, London, S. W., 16th June 1905.

From—SIR W. EMERSON, Kt.

To—His Excellency the Viceroy.

I have the honour to acknowledge receipt of your letter of May 25th in which you inform me you have asked the consent of the Trustees to invite tenders for supply of Indian marble.

Sir P. Playfair has just called on me and has been discussing the many business difficulties that appear in regard to the supply of marble from Indian quarries, and the working of it in Calcutta.

This has set me thinking again, and as a way of satisfying the Indian sentiment, how would it do to have not only the terraces and domes, but also all the plain facing made of Indian marble, and having the moulded work and all dressings in fact, of the Grecian marble? This would mean a saving on the plain facing, as the Indian price for that work is considerably less than 14s. per cubic foot, but it would mean an increased price for the moulded work as a set off against all the plain work which the Marmor Company would lose. If Your Excellency should approve of this idea, I could instruct the surveyors to separate the items in the quantities, so that we could see later on exactly what it would mean. The reason of this suggestion is that all the plain facing and small quoin stones could be readily supplied by the Native States worked as they are at present, and the difficulty of the larger stones would be altogether avoided, as also the necessity for steam plant at Makrana.

I think the conjunction of the Indian marble facing in connection with the worked Greek stone moulding would have a very good effect.

No. 125.

Telegram dated Calcutta, the 17th June 1905.

From—H. C. Eggar, Esq.,

To—The Private Secretary to His Excellency the Viceroy.

Victoria Memorial. Your circular letter 12th instant. Cannot agree Trustees should give assurance to Syndicate: would create worse difficulty. Position not understood by Emerson and Trustees. Am dealing with matter fully, suggesting proper course, sending documents; will also explain at meeting when convened by Chief Justice.

No. 126.

Nos. 1009—F. 22, dated St. Paul's Cathedral Avenue, Maidan, Calcutta, 19th June 1905.

From—ROBERT L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

As requested in your letter dated 12th June 1905, enclosing copy of a letter from Sir William Emerson to His Excellency the Viceroy, dated May 19th, 1905, I called on the Chief Justice, who has convened a meeting to be held in his private room at the High Court tomorrow, Tuesday, the 20th instant, at 4-30 P. M.

A copy of the proceedings will be sent you at an early date for His Excellency's information.

No. 127.

Viceregal Lodge, Simla, 19th June 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—SIR PATRICK PLAYFAIR, Kt., C.I.E.

I have to acknowledge the receipt of your letter of the 2nd June. The Viceroy desires me to thank you very much for the information you have sent, and for all the trouble you have taken. My letter sent by last mail will have brought up to date your information on the position of affairs in this country.

No. 128.

Dated 110, Cannon Street, London, E. C., 23rd June 1905.

From—SIR PATRICK PLAYFAIR, Kt., C.I.E.,

To—R. NATHAN, Esq. C.I.E., Private Secretary to His Excellency the Viceroy.

I have now the privilege to reply to your letter of the 16th May, with enclosures, which include a copy of Mr. T. H. Holland's report, dated 26th April, on the marble deposits at Makrana, and a letter from Messrs. Bird & Co. and Messrs. Martin & Co., dated 11th April, offering to prospect the Indian marble fields.

It is satisfactory to learn that Mr. Holland, after visiting Makrana, fully confirms the information received by the Trustees with regard to available deposits of marble, and he supplies encouraging information upon the prospect of winning the stone at an inexpensive cost with labour available locally, and that may be attracted from other districts. Mr. Holland modestly adds "it is on the important question of cutting and preparing the stones that I am unable to offer any opinion of value."

The proposal put forward by Messrs. Bird & Co. and Messrs. Martin & Co. might be a method of supplying the Trustees with the latter, all important, information. Their letter apparently refers to quarrying the marble only, and does not include shaping, moulding, and dressing the stone. These two firms do not commit themselves to supply the stone in any given instalments, or at a quoted price, and they do not wish to proceed with the investigation without some assurance of support from the Trustees, which is asked for in somewhat indefinite terms. To preserve their liberty of action the Trustees might require to know what meaning the signatories attach to the remark, "we are prepared, on learning that the Trustees are inclined favourably to consider our proposals," &c., &c.

I think it very desirable that the Trustees should maintain independence to purchase in any market they may choose, and from anyone they may select. For this reason the decision communicated by His Excellency in the letter addressed to Sir William Emerson, dated, Camp, April 6th, appears to me to be preferable to the proposal put forward by Messrs. Bird & Co. and Messrs. Martin & Co. His Excellency remarked "The Trustees decided to engage and summon to India, for the purpose of advising them as to the possibility of obtaining the entire supply from the Makrana quarries, an expert in marble quarrying familiar with the latest improvements in quarrying, plant, and machinery." If such an investigation proved a supply of marble to be available at a price the Trustees could afford to pay, there seems to be very little doubt that a Syndicate or company could be formed to work the quarries, and the cost of the investigating commission would doubtless be recoverable from such a Syndicate or Company. The cost would not be recoverable of course, if the report were unfavourable, and if supplies were not drawn from Makrana.

I do not assume that Messrs. Bird & Co. and Messrs. Martin & Co. are more philanthropic than other merchants and contractors, and that the cost to them of an investigation would not be made payable in some manner by the the Victoria Memorial Fund. At the same time I am bound to repeat, what I have communicated to you in previous correspondence, that it is not easy to secure the services of a practical man whose judgment is reliable on the various matters that have to be considered in making such an investigation, and that if the services of the gentleman I alluded to were lent, his employers would expect to have the refusal of forming a Syndicate or Company to work the Makrana quarries. It is just possible Messrs. Bird & Co., and Messrs. Martin & Co., might be able, later on, to co-operate with these people.

The opinions expressed to me by owners of quarries in Europe, based on practical experience, do not coincide with Mr. Holland's views in regard to the reliance to be placed on the quality and quantity of stone in the bed from outward appearance, and in regard to the possibility of hand labour competing with work conducted by the aid of mechanical appliances, although this outlay may not be heavy, in the instance of Makrana.

I assume the Syndicate would proceed to work with a view to establishing an industry, and I am informed that more damage is done to quarries by unscientific working than in any other way ; that some of the Carrara quarries in Italy will, in all probability, never be made use of, as it will not pay to remove the debris to obtain the unhewn stone beneath. I have been asked whether this may be the case with resources at Makrana.

I make these remarks believing it is unlikely supplies will be obtainable from Makrana at a price to compete with the cost of European marble, unless there is a prospect, as I think there should be, of establishing an industry, although Sir William Emerson, in his letter to His Excellency dated 14th April does not consider there will be any demand for Makrana marble after the supply for the Memorial is obtained.

I assume throughout that cost is an all-important consideration, and that the Trustees will be compelled, irrespective of their desire to derive supplies from India, to pay great respect to cost. I am fully prepared to learn when the quantities are taken out, that the cost even on the original basis of a price of 12s. per cubic foot for marble, is considerably above the sum of £300,000 to which Sir William Emerson has been limited. Any higher quotation for marble will, of course, enhance the total cost of the building.

Sir William Emerson has remarked to me in conversation, it will be almost impossible for him to reduce the dimensions satisfactorily if the cost works out above his figure, and, of course, the foundations have been laid to suit the original design. It will be a great help to the Trustees when considering the question of a contract for marble, to have before them the quantities calculated by the surveyors, and I would suggest that Sir William Emerson be asked to give this information at as early a date as possible.

In conclusion, I beg leave to suggest—

- (a) That the Trustees should meet the cost of investigating the Makrana field, and that the examination of the marble quarries should be carried out under their direct agency.
- (b) That if, for reasons I am not aware of, the above is impracticable, Messrs. Bird & Co.'s, and Messrs Martin & Co.'s, offer to prospect be only accepted provided the Trustees maintain their independence and liberty to purchase supplies in any market, and at any price.
- (c) That Sir William Emerson be invited to inform His Excellency and the Trustees at the earliest date possible of the estimated cost of the building on the Quantity Surveyor's report.

No. 129.

D. O. No. 371-C., dated Simla, the 24th June 1905.

From—T. H. HOLLAND, Esq., Director, Geological Survey of India,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

The copy of Sir William Emerson's letter of the 2nd instant has just reached me with your letter of yesterday. For my reference to Mr. Blount's report in paragraphs 22 and 23 of my note on Makrana, I had to depend on memory, as there was not time to get a copy of his report from Calcutta before the departure of the mail by which His Excellency wished to send my note. I have, however, now sent for the papers, and will let you know exactly what he wrote.

2. It is hardly likely that Mr. Blount failed to notice the coarse-grained character of the Makrana marble, as the crystals in the white varieties are generally many times the size of those in the samples of Carrara and Greek marbles now in Calcutta. The reference to Merrill's book in paragraph 23 of my note shows that coarseness of grain is generally regarded as a sign of inferiority; but, as far as mere resistance to weather is concerned, more depends on the way in which the crystals are intergrown than on their size. When the promised tests are complete, I will deal with this point in detail, and will send you photographs of thin slices under the microscope, showing the way in which the crystals are intergrown in different varieties of marble.

No. 130.

Dated St. Paul's Cathedral Avenue, Maidan, Calcutta, the 27th June 1905.

From—ROBERT L. SEVENOAKS, Esq., Secretary to the Trustees of the Victoria Memorial,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I enclose, for His Excellency's information, a copy of the Minutes of an informal meeting of the Trustees held at the Chief Justice's private room, High Court, on Tuesday, June 20th. The draft was returned me by the Chief Justice from Darjeeling on Sunday last.

I may say, beyond the information given by Sir William Emerson in his letter dated May 19th, 1905, to His Excellency, I have no further data for contractors to base tenders on. I have therefore written the Architect on the matter.

I also enclose extract from two letters received from Sir William Emerson as to whether the contract for the supply of marble should be distinct from the contract for the building &c.

[ENCLOSURES TO THE ABOVE LETTER.]

THE TRUSTEES OF THE VICTORIA MEMORIAL.

MINUTES OF THE PROCEEDINGS OF AN INFORMAL MEETING OF THE TRUSTEES OF THE MEMORIAL PRESENT IN CALCUTTA, HELD IN THE CHIEF JUSTICE'S PRIVATE ROOM HIGH COURT, CALCUTTA, ON TUESDAY, JUNE, 20th, 1905, AT 4-30 P. M.

PRESENT :

The Hon'ble Sir Francis Maclean, *Kt.*, K.C., K.C.I.E.
The Hon'ble Mr. A. A. Apear.
E. Denison Ross, Esq., Ph. D.
W. D. Cruickshank, Esq., C.I.E.
H. C. Eggar, Esq.
Maharaj-Kumar Prodyot Coomar Tagore.

READ—

(a) A letter dated the 12th June 1905, from the Private Secretary to His Excellency the Viceroy to the Superintending Architect, suggesting that the Chief Justice should be asked to summon an informal meeting of the Trustees to discuss the following points :—

- (1) whether the contract for the supply of the marble should be distinct from the contract for the building.
- (2) the desirability of confining the present negotiations to Messrs. Bird & Martin, or of inviting public tenders.

(b) A notice dated the 19th June 1905 convening the meeting.

The Trustees present proceeded to consider the question submitted to them, and after discussion it was unanimously resolved—

- (1) That whilst there were undoubted advantages in the contract both for the marble and the superstructure being taken by the same contractors, the Trustees felt that there must be great delay if the contract for the former were kept back until tenders could be made for the contract for the superstructure. There would be nothing to prevent the contractor for the marble subsequently tendering for the contract for the superstructure. They, therefore, thought it better that tenders for the marble contract should be proceeded with, with all practicable despatch. In this connection the Trustees desired to point out that it would be advisable that the contract for the supply of the marble should cover the whole of the work of quarrying and getting from the Makrana quarries and of supplying the same to the Trustees in Calcutta according to samples, specification, and drawings to be furnished by the Architect, and not merely tender for delivery into the railway trucks at Makrana.
- (2) That the public tenders for the contract for the supply of marble should be invited by advertisement in England and India.

The Trustees present had also under consideration the question of whether or not the concession from the Native State should be taken in the name of the Trustees of the Victoria Memorial, and, though the matter had not been specifically referred to them, the Trustees present were disposed to recommend that the concession should be taken by, and in the names of, the Trustees.

Extract of a letter dated April 28th, 1905, from Sir William Emerson, Kt., to R. L. Sevenoaks, Esq.

"In regard to your clause No. 10, if Indian marble were used, I should say it would be at least three years before we could commence the superstructure, for it would certainly take a year to get the reports, and to make up their minds, it would then take a year to

“lay down the plant and commence quarrying, and certainly another year to get anything like a sufficient supply and working it to keep the building going”.

* * * * *

“I enclose you a copy of a letter I have sent to His Excellency today for your information, which explains how I arrived at an average cost of Rs. 4, annas 3, for the Indian marble. As to getting a rough approximate covering cost, were the quantities taken out, and all the large sized blocks kept separate, we might make a closer estimate, but of course that will not be ready for at least six months. The difficulty is in estimating what they would charge per cubic foot, and whether they could obtain the large stones, such as those that will be required for the corners of pediments, &c. At any rate, I think it will be foolish to take it at less than Rs. 4, or Rs. 4, annas 3, as an all round price.”

Extracts of a letter dated May 19th, 1905, from Sir William Emerson, Kt. to R. L. Sevenoaks, Esq.

“I now enclose you copy of a letter I have sent this week to the Viceroy, which will explain itself.

“I think if they can make a contract with such a syndicate, it would get us out of a difficulty that has hitherto hampered us with regard to any supply from Makrana. Such a contract should be for any quantity that may be required, say, from 50,000 c. ft. to 200,000 c. ft.; this will allow sufficient margin for any errors in our rough quantities.

“Of course the points as to delivery, quality, and rejection in Calcutta should be similar to those which were arranged in the draft contract for the Marmor Company. This you and Mr. Eggar could do quite easily, it need only be a short contract.

“Should Messrs. Martin & Bird get the contract, it would simplify matters, if Messrs. Martin afterwards obtain the contract for the superstructure, as any delay in the supply, they themselves would then be responsible for.

“As to their obtaining a concession, it appears from Dr. Holland’s report that the quarries are already owned or worked by a number of different Natives, so I suppose this concession would mean coming to some arrangement with these people.

“Dr. Holland mentions four quarry owners—Gulab, Allah-u-din, Mustafa, and Quadr-Baksh.

“Anyhow whatever arrangement or concession is arrived at, if it is to come to anything, it should be done at once, so that quarrying could be commenced shortly, and, at any rate, the facing stones and bonders should be prepared, so that there need be no hindrance of the superstructure being commenced early next year.

“All the details will necessarily have to be left to you and Mr. Eggar, if this scheme is entered upon.

“You had better speak to Messrs. Martin, and tell Mr. Mookerjee that they had better look into details, so as to be ready should His Excellency ask them for a tender.

No. 131.

Dated Simla, the 28th June 1905.

From—S. M. FRASER, Esq., C. I. E., Offg. Secretary to the Government of India, Foreign Department,

To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

His Excellency the Viceroy will be pleased to know that the Bombay, Baroda, and Central India, and the Jodhpur Bikaner Railways have agreed to convey marble for the building of the Victoria Memorial Hall at Calcutta on the same terms as the East Indian Railway, that is, to carry it free and to charge only actual handing expenses at the station of origin.

No. 132.

Dated 2, Grosvenor Mansions, 76, Victoria Street, London, S. W., 30th June 1905.

From—SIR W. EMERSON, Kt.,

To—His Excellency the Viceroy.

Victoria Memorial, Calcutta.

I have the honour to acknowledge the receipt of Your Excellency’s letter of June 8th *re* tenders for Indian marble and my proposed visit to Calcutta, for which I am much obliged.

In reference to the tenders, I wrote to Mr. Sevenoaks some time ago and suggested his asking Messrs. Martin & Co. to commence making their enquiries so that in the event of the Trustees inviting them to give a tender, they would be able to do so without delay.

In reply to this Mr. Sevenoaks makes the following remarks :—

“Regarding the working of the Makrana quarries by a Syndicate, I agree with you, it is the only feasible way of getting over the marble difficulty, but whether the estimate will work out to any reasonable figure, permitting the acceptance of the Trustees, remains to be seen. In the event of this scheme falling through, it is difficult to surmise what other resources the Trustees intend reverting to.

“As suggested by you, I have approached Mr. Mookerjee on the subject. He tells me it will be quite impossible for the Syndicate to move further in the matter at present till they receive some definite reply to their application addressed through Mr. Greer, and forwarded by him to the Viceroy. Should, however, the Viceroy approve of the scheme, before submitting any estimate, the Syndicate would have to make searching enquiries as to cost for obtaining the necessary machinery for both winning and working up the marble ready for fixing; general working expenses; establishment; housing of workmen and coolies, &c., &c., &c. This he considers will take at least six months, and fully twelve months before actual operations could be started at Makrana.

“It is only reasonable and advisable that a Syndicate of this kind should go thoroughly into all details before committing themselves in any way. The scheme will be a very large and elaborate one, and will require the strictest investigations. I trust, therefore, it will not be long before some action is taken by the Viceroy. At present I have received no orders on the subjects. Being Secretary to the Trustees, I presume the matter will have to pass through my hands.”

I do not know whether Your Excellency fully appreciates the seriousness of such a delay as is mentioned in the above. If the Syndicate could not commence working at Makrana before 18 months after they are asked for a tender, it would mean that the work in Calcutta in the superstructure could scarcely go on for at least two years or more from the present time; which would involve considerable expense in maintenance of the work already done and preserving it from deterioration during that time.

I did not understand from Messrs. Bird and Martin's letter to Mr. Greer that they were proposing more than just quarrying and supplying the marble; but from Mr. Sevenoaks' letter, Messrs. Martin & Co. apparently were intending giving a tender for both winning and working up the marble at Makrana. I think the cost of winning the marble at the quarries should be kept separate from the cost of working it up and moulding, &c., to fix in the building.

This latter has already been gone into by Messrs. Martin, as my letter of 16th December 1904 shows, and copies of their estimates were forwarded to Your Excellency at the end of that letter. These estimates might require revision on tendering for the whole superstructure, and it would then be for the contractors to say whether they could work it more expeditiously, cheaply, and satisfactorily in Makrana or Calcutta.

In my judgment it would be best to work it up in Calcutta; it would save much time in fixing up the steam plant rather than transporting it to Makrana, and anything going wrong could be more easily remedied, and all the work as it was being prepared would be under the eye of the Superintending Architect—a most important point.

Were this decided on, I cannot see that it should take more than a few weeks for the Syndicate to give a price for quarrying, including putting down the necessary plant in the way of cranes, derricks, and sawing machines, &c., at Makrana.

Were the tender for the supply of the marble satisfactory, a quantity of the facing stones could probably be supplied in a few months, and so save such a dreadful waste of time.

The small scale working drawings are now finished, and we are making the necessary copies, and the Surveyors are getting on with the quantities, so that I am hoping all will be ready for getting an estimate and arranging a contract by next cold weather.

No. 133.

Dated Simla, the 30th June 1905.

From—T. H. HOLLAND, Esq., Director, Geological Survey of India.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Please refer to Sir William Emerson's letter, dated 2nd instant, to His Excellency, my demi-official No. 371-C. of the 24th, and paragraphs 22 and 23 of my Note on Makrana, dated April 26th, 1905. I find that Mr. Blount has made two reports for Sir William Emerson on Indian marble; one, dated July 9th, 1903, refers to a sample of Makrana marble, the other, dated November 23rd, 1903, describes the tests made on two samples of Sagyin marble. In an appendix to the latter report, he mentions, amongst the characters by which he is led to regard the Sagyin marble as "slightly inferior" to the various specimens (Italian, Pentelic, and Makrana) previously reported on, that the Sagyin material is coarser in texture. From his use of the comparative, from the next sentence, in which he says "the difference is not great," and from my knowledge of the fact that the average Makrana marble is actually composed of calcite crystals noticeably larger than ordinary saccharoid marbles, I assumed, when writing from memory, that Mr. Blount had noticed this feature in the Makrana samples also. Apparently I was mistaken, and the discovery of my mistake makes it easier now to understand Mr. Blount's failure to give precise quantitative estimates of other features of practical value to those responsible for selecting the marble best suited to withstand the Calcutta climate. I have now read Mr. Blount's reports more carefully, and have come to the conclusion that to unravel their precise meaning is likely to lead to less practical results than can be obtained by a re-examination of average specimens.

2. Mr. Blount exposed the Indian marbles to a freezing temperature, and reported that the test pieces were unaffected, whether wet or dry. By "unaffected," he means presumably "apparently unaffected;" for a porous rock would suffer a certain loss in strength if frozen when wet, and a quantitative expression of the change would thus be indirectly a test of the porosity, which is a serious source of mischief in a building stone. But the Victoria Memorial will never be exposed to a freezing temperature, and a point of more practical importance would be the determination of the structural changes induced in the marble when raised by the Indian sun to a temperature of 150° F. before exposure to the monsoon rains.

3. Mr. Blounts has referred to one of the samples of the Sagyin marble as of "moderately fine crystallization," and to the other as "close in its crystalline texture." Either he must have examined most exceptional specimens, or he uses these vague terms in a way unknown to the petrologist. It would be more instructive to know the average, or the variation in, actual size of the constituent crystals of calcite; for the Sagyin marble is of a kind which a petrologist, when justified in departing from precise terms, would describe as "excessively coarse," and from Mr. Blount's reference to "lines and markings some an inch or more in length," I have more than a suspicion that he examined a normal specimen, although he does not explain whether these, "indicating incipient fissures in the mass," were twin-planes, crystal cleavage cracks, or ordinary rock-fractures; they are probably the twin bands so commonly shown by Sagyin marbles, and their lengths, "an inch or more," indicate the diameter of the crystal sections; marble with crystals an inch or more across would be described as excessively coarse.

4. It is the *kind* of mineralogical structure, however, more than the *size* of grain, which is important to the builder; for marbles which are *granulitic* in structure can sometimes be reduced to sand by the finger nail, and are porous enough to give rain-water its full destructive effect, whilst others, in which the crystals are completely intergrown, with the typical *granitic* struc-

ture, have the full strength and resistance of the undamaged crystal. Much of the Italian marble imported into India belongs to the former class, whilst typical Makrana and Sagyin marbles are of the latter kind. On account of the fact that fine-grained marbles are the result of hurried crystallization, or of subsequent granulation by crushing, the coarser-grained varieties are generally to be preferred for strength, and generally resist the weather more effectually. Other things being equal, one would thus prefer the coarser marble on the ground of structural stability.

5. The selection of marble for the Victoria Memorial, however, should be based, not on theoretical considerations merely, but on comparative practical tests, which can be expressed with quantitative precision, and which are made under conditions sufficiently imitative of those under which the building will afterwards stand. The fact, that a marble is apparently unaffected by freezing, is of little value: no ordinarily respectable marble is thus affected. We want the marble which is least vulnerable to rain-water at tropical temperatures, and are less interested in Mr. Blount's test with regard to its resistance to sulphurous acid, which does not trouble us in Calcutta when the atmosphere is chemically active. We want a marble sufficiently pure chemically to leave no coloured insoluble residue to stain its surface when it is submitted to the inevitable atmospheric attack: the only point in Mr. Blount's reports expressed in figures is the chemical composition of the Indian samples, and even in his chemical analyses he does not distinguish between the alumina, which is harmless, and the ferric oxide, which leaves a stain. It seems to me that it is Mr. Blount's reports, not mine so much, that need "elucidation."

6. As it appeared, after I urged the consideration of Indian marble in 1903, that there were apparently insuperable difficulties other than the question of quality, I had to allow the examination of samples to be displaced by other urgent questions. Now the other difficulties have been removed, I have made arrangements for thorough tests of average samples, and I hope, at the end of the next monsoon, that His Excellency will be in possession of facts sufficiently precise to settle the question of quality: whether the actual results are in agreement, or at variance, with the prejudices which I have formed from purely theoretical considerations will not affect the actual figures.

[ENCLOSURE TO THE ABOVE LETTER.]

Appendix to Report by Mr. Bertram Blount, dated 23rd November 1903, on two samples of Sagyin marble.

I have compared the results of the tests on these two samples with those previously made on Italian and Pentelic marble (examined on March 15th, 1902), and on a sample of Indian marble (examined on July 9th, 1903) in order to decide the relative merit of the materials.

I find that the amount of corrosion and the local character of the corrosion are rather more marked in the present samples than in any of the previous specimens. Their texture also is coarser and less regular than that of the former samples. Though the difference* is not great, and though the Sagyin marble is of good quality, yet I am of opinion that it is slightly inferior to the various marbles previously reported on.

* The use of the singular limits the comparison to the question of texture: the marbles previously examined would thus be nearly as coarse as those from Sagyin. As, however, Mr. Blount now says that he did not notice the coarse-grained character of the Makrana marble, he presumably intended to write "the differences are not great"—differences in texture, liability to corrosion, &c.

T. H. H.

No. 134.

Dated Viceregal Lodge, Simla, 30th, June 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—S. M. FRASER, Esq., C.I.E., Officiating Secretary to the Government of India, Foreign Department.

The Viceroy spoke to you this afternoon about the proposal made by a meeting of some of the Trustees in Calcutta that the concession for the Makrana marble should be taken by, and in the names of the Trustees.

I am desired to send you the following papers :—

- (1) A copy of the proceedings of the meeting.
- (2) An extract from a letter from Mr. Eggar (dated June 12th).

The above extract explains the grounds on which the recommendation of the Trustees was based.

His Excellency will be much obliged if you will discuss with Mr. Hewett what it will be best to do.

No. 135.

Dated Viceregal Lodge, Simla, 3rd July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

To—T. H. HOLLAND, Esq., Director, Geological Survey of India.

I have to thank you for your letter of the 30th June about Makrana marble.

The Viceroy desires me in this connection to forward, for your information, a copy of the accompanying correspondence relating to weather tests which are being carried out in Calcutta and which will perhaps be a useful supplement to the tests which you are about to undertake.

[Enclosures to the above letter].

Letter to Mr. R. L. Sevenoaks, dated 6th April 1905.

Letter from Mr. R. L. Sevenoaks, dated 10th April 1905.

No. 136.

Dated Simla, 4th July 1905.

From—S. M. FRASER, Esq., C.I.E., Offg. Secy. to the Govt. of India, Foreign Dept.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

As requested in your letter of the 30th June, I have discussed with Mr. Hewett the proposal made by a meeting of some of the Trustees in Calcutta that the concession for the Makrana marble should be taken by and in the name of the Trustees.

For the reasons given in the letter from Mr. Eggar, dated the 12th June 1905, of which you forwarded me an extract, Mr. Hewett concurs that this would be the best course to pursue.

The terms of the concession to be obtained from the Durbar appear to be, in the main, a comparatively simple matter. At present the Jodhpur State derive revenue from the Makrana quarries from two sources—

- (1) Royalty,
- (2) Rent.

With regard to the royalty, the Durbar at present charge 10 annas a maund which (as Mr. Holland, who has been good enough to supply me with the figures, informs me) is equivalent to 55 per cent. on the cost price of marble raised at the quarry. This rate is, of course, absurd, and the Durbar, who, in their letter of 8th February 1904 to the Resident, were willing to reduce the rate to annas 4, in consideration of the purpose for which the stone is required, will doubtless make a further reduction. In British India the maximum rate of royalty for the commoner minerals is 5 per cent., which, in the case of the Makrana marble, would work out at under 1 anna a maund, and this is the rate which I think we might propose to the Durbar to charge. It will be for them to point out (if it is the case) that this rate will involve a loss of revenue. Reckoning the amount of marble from the quarries as practically inexhaustible, it will probably prove that a large output with a lower royalty will bring in a larger sum than the present limited output with the higher royalty.

As regards the rent, the Durbar at present charge private contractors annas 8 to Rs. 2 a yard along the strike. The same rate, I think, the Trustees ought to pay, particularly as the total involved amounts to a small sum only. Mr. Holland has calculated that the whole of the 170,000 cubic feet required could probably be extracted from a length of 500 feet, which means that the rent would be a matter of Rs. 84 to Rs. 332 annually—a mere trifle. In addition there will probably be compensation to be paid to any private contractors whose length of quarry had to be taken up during the currency of their existing leases.

A third item which I think we might fairly ask the Durbar to concede is the construction of a railway siding from the station to the quarry. As pointed out in paragraph 15 of Mr. Holland's report of the 26th April 1905, a mile, at a cost of Rs. 5,000 (using old rails from the main line), would probably be sufficient, and in view of the subsequent use of the siding for the quarries, the Jodhpur Durbar has expressed its willingness to meet this small initial cost. In so doing, they, it is true, have hitherto been under the idea that they were to be asked to supply the marble themselves, but it is not likely that their attitude towards the proposal will in any way be altered by the fact that the marble is to be extracted by a contractor, for they will be quick to see the benefit from the opening out of the quarry and the creation of a permanent industry on a vastly increased scale, which they may be able to take over themselves when the concession given to the Trustees lapses. The chance of obtaining the contractors' machinery at favourable rates, when it is done with, will also doubtless be present to their minds. They might further be told that the grant of the concession to the Trustees does not mean the temporary extinction of the small private contractor, for the latter will almost certainly be ready to purchase supplementary marble from contractors working other quarries, where the varieties of marble may be suitable for special requirements of the building.

The action I would propose is that the Foreign Department now sound the Jodhpur State through the Political Agent as to their willingness to grant a concession containing the terms I have sketched above as to royalty, rent, and the railway siding. The subsidiary points mentioned by Mr. Eggar, *viz.*, power to erect buildings for housing marble, machinery and workshops, and that the concession should be made terminable by the Trustees only on notice, when all marble has been extracted and taken and buildings have been removed, will also be specified.

No. 137.

Dated Viceregal Lodge, Simla, 6th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—ROBERT L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial.

Your letter of the 27th June. The Government are entering into negotiations with the Jodhpur Durbar to obtain a concession to quarry Makrana marble for the Victoria Memorial Hall. The Viceroy thinks that you and Mr. Eggar had better put your heads together and draw up a form for public tenders on the supposition that the concession is in the hands of the Trustees. It is important to get the tender form ready as quickly as possible, because the Viceroy wishes to send it home very soon. Sir William Emerson is getting a little agitated as to what ought to be done at his end.

No. 138.

Dated Viceregal Lodge, Simla, 6th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

To—H. C. EGGAR, Esq., 30, Dalhousie Square, Calcutta.

I have, on His Excellency's instructions, written to Sevenoaks asking him to draw up a form of tender in consultation with you on the supposition that the concession for Makrana marble from the Jodhpur State will be taken by the Trustees. The Viceroy will be very glad if you will kindly co-operate with Sevenoaks in the matter. I have explained to the latter that it is important that the tender form should be got ready as soon as possible.

No. 139.

Dated Viceregal Lodge, Simla, 6th July 1905.

From—His Excellency the Viceroy,

To—SIR WILLIAM EMERSON, Kt. 2, Grosvenor Mansions, 76, Victoria Street, London.

We are getting along here. The Government of India are about to obtain the concession for the Makrana quarries from the Jodhpur State so as to put ourselves in a better position to deal with contractors. We shall, I think, obtain a further considerable reduction in the royalty.

We then propose to invite tenders for the supply of the marble both here and in England. The form of invitation is being drawn up by Eggar and Sevenoaks. It will be sent to you for your advice as to action at your end.

In reply to your letter of June 16th, I should be sorry if we were now to go back and begin haggling again with the Marmor Company. In my view they had and threw away their chance. Not until we are satisfied that we cannot get the moulded work satisfactorily done in India, will the Trustees, I think, be willing to reopen negotiations with Mr. Gunn.

I believe that we can get the whole thing done in India, if we combine to remove the difficulties, and work hard.

No. 140.

Dated Viceregal Lodge, Simla, 7th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—S. M. FRASER, Esq., C.I.E., Offg. Secretary to Government, Foreign Department.

The Viceroy agrees to the action proposed in your letter of the 4th July regarding the steps to be taken with a view to obtaining a quarrying concession from the Jodhpur State.

No. 141.

Dated 30-2, Dalhousie, Square, Calcutta, 10th July 1905.

From—H. C. EGGAR, Esq.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

Victoria Memorial.

I have your letter of the 6th, asking me to co-operate with Sevenoaks in drawing up a form of tender (form of advertisement for tenders) on the supposition that the concession for Makrana marble from the Jodhpore State will be taken by the Trustees. I prepared a form to accompany my letter to you of the 12th June but it is evident from your letter that it has gone astray. I circulated five copies of my letter to the Trustees in Calcutta before the informal meeting held on the 20th June, and, possibly, the missing document was by mistake enclosed with one of the copies instead of with the original letter. I will prepare another. I have seen Sevenoaks and given him an appointment to go into the matter tomorrow.

No. 142.

Dated Viceregal Lodge, Simla, 11th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—SIR PATRICK PLAYFAIR, Kt., C.I.E., 110, Cannon Street, London, E. C.

I have to acknowledge the receipt of your letter of the 23rd June, and to say that the Viceroy thanks you for the advice you offer on my circular letter of the 16th May.

You notice, with approval, the suggestion that was entertained some time ago to engage and summon to India for the purpose of examining the Makrana quarries an expert in marble quarrying; and you state, as your first conclusion, that the Trustees should meet the cost of investigating the Makrana fields, and that the examination of the marble quarries should be carried out under their direct agency. This suggestion has since been abandoned under the advice of Sir William Emerson who, after reading Dr. Holland's report and the letter from Messrs. Bird and Martin, said that he did not see the slightest necessity for sending out an expert. He remarked that any contractors would naturally get their own competent quarry foreman, and that local labour or imported would be a question for them to decide if their tender were accepted.

I may now explain, for your information, the present position of affairs here. On the 20th of June a meeting of the Trustees present in Calcutta was held, at the suggestion of His Excellency, to discuss various preliminary matters which required to be settled before we proceeded further. At this meeting the Trustees advised as follows :—

(1) That public tenders for the contract for the supply of marble should be invited by advertisement in England and in India.

(2) That arrangements for tenders for this contract should proceed with all practicable despatch, and that they should not be kept back until tenders can be made for the contract for the superstructure.

(3) That the contract for the supply of marble should cover the whole work of quarrying and getting from the Makrana quarries and of supplying the same to the Trustees in Calcutta according to samples, specification, and drawings to be furnished by the Architect, and not merely tender for delivery into the railway trucks at Makrana.

(4) That the concession from the Jodhpur State should be taken by, and in the name of, the Trustees.

On receiving this advice His Excellency invited Mr. Eggar to draw up, in conjunction with Mr. Sevenoaks, a form for public tenders on the supposition that the concession is in the hands of the Trustees, and at the same time he caused steps to be taken with a view to obtaining the concession from the Jodhpur Durbar. As soon as the tender form is ready, His Excellency will send it home to Sir William Emerson.

No. 143.

Dated Viceregal Lodge, Simla, 14th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,
To—H. C. EGGAR, Esq.

Thank you for your letter of the 10th July. The form which should have accompanied your letter of the 12th June must, as you say, have gone astray. I note that you have seen Sevenoaks and were to discuss matters with him on the 11th. The Viceroy was greatly interested by your letter which will be of much use in furthering the progress of the cause.

No. 144.

Dated Viceregal Lodge, Simla, 18th July 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,
To—ROBERT L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial.

I am desired to forward, for the information of the Trustees, the accompanying copy of a letter dated 30th June 1905 from Sir W. Emerson.

No. 145.

Dated St. Paul's Cathedral Avenue—Maidan, Calcutta, 24th July 1905.

From—ROBERT L. SEVENOAKS, Esq. Secretary to the Trustees, Victoria Memorial,
To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I beg to acknowledge receipt of your letter dated July 18th, 1905.

With the papers before him Sir William Emerson was aware of what had already transpired and the preliminary actions taken by the Trustees for the supply of marble by a Syndicate, and my words were intended to convey that I hoped it would not be long before a settlement would be arrived at.

No. 146.

Dated 30, Dalhousie Square, Calcutta, the 1st August 1905.

From—H. C. EGGAR, Esq.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I now, after unavoidable delay, send you for His Excellency's approval a form of advertisement for tenders for the work in quarrying, getting, and supplying Makrana marble to the Trustees in Calcutta.

In my letter to you of the 12th June last I pointed out that the Bird-Martin proposals had reference to the quarrying of marble and its delivery in blocks on rail at Makrana, and not to the delivery at Calcutta of marble worked according to specification; and that, if such proposals should be accepted, it would remain for the Trustees either to provide a staff of competent workmen to cut and work the marble in Calcutta, or to employ other contractors for such work, even to the cutting of facing stones from the rough blocks.

The form of advertisement which should have been sent with my letter above referred to was prepared on the assumption that the work consisted in the entire work, and, when you asked me to send a form of advertisement upon the basis that a concession had been obtained from the Native State, I was under the impression that I had to provide for the entire work, following what was done in regard to the Marmor Company. I attempted it, but found difficulty in drafting an advertisement on such lines owing to the uncertainty as to the position regarding samples, specifications, and drawings. I, however, drafted a form of advertisement for publication in India and England.

Sir William Emerson telegraphed—"Marble supply should be distinct from contract for building. Useless inviting English contractors to supply Indian marble. Tendering for superstructure and worked marble impossible till quantities are ready at end of year." His intentions are now, I think, made clearer by his confirmatory letter to Mr. Sevenoaks, dated the 14th July and received on the 30th. In such letter Sir William Emerson explains—"What it seems to me is wanted now is a tender for the supply of facing marble" (and bonding stones) "and roughly squared cube stones, as mentioned in my letter to His Excellency dated May 19th. The Trustees cannot obtain tenders for working up the marble in the superstructure generally, till the quantities and conditions of contract are got out and the drawings and duplicates and specifications are ready, which will not be till the latter part of the year."

This is not consistent with what was done in regard to the Marmor Company, for the draft contract with them was for the entire work. Clearly Sir William Emerson contemplates that the tenders to be now invited should be confined to the portion of the entire work which consists in quarrying the marble, cutting and sand-facing the facing marble and bonding stones, and delivering the marble in Calcutta. The working of the marble is, as I pointed out in my letter of the 12th June, to be left to a later stage, when the Trustees will make other arrangements for that part of the work.

I have drafted the advertisement on these lines after several conferences with Mr. Sevenoaks.

Mention is made in the form of advertisement of the concession from the Jodhpur State and of the arrangements with the railway administrations.

Particulars of the concession and arrangements should be held in readiness at the Superintending Architect's office for inspection by tenderers, as they will require to consider them in preparing their tenders.

I do not know what arrangements have been made with the railway administrations, but I am apprehensive regarding them. I have some recollection that one of the Trustees stated at a meeting that the East Indian Railway would undertake to carry either at a reduced rate or free of charge, when they should be able to do so, that is, at their convenience or when wagons should be available. I think a difficulty will arise, firstly, from the fact that the marble will have to be transferred from a railway of one gauge to a railway of another gauge, and, secondly, from the fact that the railway have not sufficient rolling-stock for more than very ordinary demands. If difficulty is occasioned, it will cause delay, and the contractors for the marble will require extensions. They will seek to include an exemption clause in their contract to meet any such contingency.

Another point to be noticed in the form of advertisement is that in regard to samples. In the absence of samples I have felt bound to provide that tenderers shall furnish them, and that they will be given permits to prospect the quarries to obtain samples for approval. It seems to me there must necessarily be samples to work from.

You will notice that, in the paragraph of the form of advertisement stating what the prices in the tenders are to include, I have stated that such prices are to include the cost "in quarrying and getting marble at the quarries" using the word "marble," as it were, in the abstract, and that, later on, I refer to "the marble to be supplied." I have an object in this. It seems to me from Mr. Holland's report to be possible that, in getting the marble of the uniform colour required, the contractors may have to quarry other marble, and the quarrying of undesirable marble to get at that which is desirable may (I do not know the terms of the concession) give rise to a claim for royalty on the undesirable marble quarried.

I also enclose a specimen form of tender.

As the work for which tenders are to be invited will not include the working of marble according to specification it will be unnecessary to advertise in England, or, unless His Excellency should consider such a course in courtesy desirable, to send the form of advertisement to Sir William Emerson for approval.

[ENCLOSURES TO THE ABOVE LETTER.]

VICTORIA MEMORIAL ACT 1903.

To

Contractors and others

Persons desirous of tendering for the execution of the work of quarrying and getting from quarries situated at or near Makrana in the Native State of Marwar or Jodhpore in Rajputana and of supplying to the Trustees of the Victoria Memorial in Calcutta all such marble, whether cube stones, facing stones or bonding stones as may from time to time be required by the Trustees for use in the erection of the Memorial may obtain a form of tender on application, on any day during business hours, at the office of the Superintending Architect in charge of the Victoria Memorial Calcutta.

Such persons must at their own risk and expense obtain all information and satisfy themselves of all probable contingencies and generally of all matters which may in any way influence them in making a tender, and no extra allowance, compensation or payment, beyond the amount mentioned in the tender or contract, will be made to the contractor should any matter or thing in respect of the work to be executed prove in any respect to be different to what the contractor may have anticipated or may have been led by any representation or condition to anticipate.

The contractor will be required to deliver to the Trustees at the site of the Memorial in Calcutta during the period of twelve calendar months from the date of the contract 30,000 cubic feet of marble in blocks and also 30,000 superficial feet of 3 inch facing marble and bonding stones with all faces to be exposed rubbed and finished to a finest possible sanded face; and, after the expiration of such period, all such additional marble as shall from time to time be required up to but not exceeding 50,000 cubic feet in any one year. The total quantity of marble that will be required is estimated at 200,000 cubic feet, but the Trustees do not bind themselves to such estimate.

A concession in respect of the quarrying and getting of marble from the Makrana quarries has been granted by the Native State in favour of the Trustees and "arrangements have been made on behalf of the Trustees with the railway administrations for facilities in transport, the particulars whereof can be ascertained on application as aforesaid. The contractor will be afforded the benefit of such concession and arrangements.

The contractor will be required to exercise the greatest care in the selection of the marble to be supplied, and the marble selected is to be free from iron pyrites, flaws, vents, shakes or other defects or large dark or colour spots or patches, save that marble with veins of a small degree of blue colour will be permissible. The bonding stones are to be selected with darker blue markings on the faced edge.

Tenderers will on application as aforesaid be furnished with a permit to enter upon and prospect the quarries, and they must obtain therefrom samples of marble corresponding to the above description and submit them with their tenders for the approval of the Architect.

The prices to be stated in the tenders are to be all round prices per foot cube for blocks of marble averaging 25 feet cube and per superficial foot for 3 inch facing marble, 15 inches high and from 2 feet to 4 feet or thereabouts in length, and for 3 inch bonding stones, 8 inches on the bed and from 2 feet to 4 feet in length or thereabouts, and such prices are to include the cost of all materials, plant and labour in quarrying and getting marble at the quarries and of cutting and sand facing the marble at the quarries as required, the royalties or other charges payable to the Native State, the cost of conveyance of the marble to be supplied from the quarries to the rail, of the transport thereof, and of all loading and unloading, and all other costs, charges and expenses, in and incidental to the delivery of the marble to be supplied free at the site of the Memorial in Calcutta.

The Trustees do not bind themselves to accept the lowest or any tender. The acceptance of a tender will not be binding on the Trustees until a contract in respect thereof shall have been duly executed.

The contractor will be required to furnish security to the satisfaction of the Trustees for the due fulfilment of his contract.

Tenders are to be made on the prescribed form and to be delivered at the office of the Superintending Architect in charge of the Victoria Memorial Calcutta on or before the day of 1905.

CATHEDRAL AVENUE MAIDAN,
CALCUTTA;
August 1905. } By Order of the Trustees of the Victoria Memorial.

Superintending Architect in charge Victoria Memorial.

VICTORIA MEMORIAL ACT 1903.

Tender

for the execution of the work of quarrying and getting from quarries situate at or near Makrana in the Native State of Marwar or Jodhpur in Rajputana and of supplying to the Trustees of the Victoria Memorial in Calcutta all such marble whether cube stones facing stones or bonding stones as may from time to time be required by the Trustees for use in the erection of the Memorial.

To

The Superintending Architect,
in charge of the Victoria Memorial, Calcutta,
Cathedral Avenue, Bhowanipore, Calcutta.

SIR,

In response to your advertisement inviting tenders $\frac{1}{w}$ offer and undertake to quarry and get from quarries situate at or near Makrana in the Native State of Marwar or Jodhpur in Rajputana and to supply to the Trustees of the Victoria Memorial in Calcutta all such marble whether cube stones facing stones or bonding stones as may from time to time be required by the Trustees for use in the erection of the Memorial at and for the following prices:—

- A. For roughly squared blocks, averaging 25 feet cube, per foot cube
- B. For 3 inch facing marble 15 inches high and from 2 feet to 4 feet or thereabouts in length, including sand facing, per superficial foot
- C. For 3 inch bonding stones 8 inches on the bed and from 2 feet to 4 feet in length or thereabouts including sand facing, per superficial foot

The above mentioned prices include the cost of all materials, plant and labour in quarrying and getting marble at the quarries and of cutting and sand facing the marble at the quarries as required, the royalties or other charges payable to the Native State, the cost of conveyance of the marble to be supplied from the quarries to the rail, and of the transport thereof, and of all loading and unloading, and all other costs, charges and expenses in and incidental to the delivery of the marble to be supplied free at the site of the Memorial in Calcutta.

In the event of this tender being accepted by the Trustees of the Victoria Memorial ^I/_{W.} undertake to enter into and execute a formal contract and a bond with two sureties for the due fulfilment of such contract to the satisfaction of the Trustees and in the forms presented by them.

^I/_{W.} have the honour to be,

SIR,

Your most obedient servant (s),

No. 147.

Dated Viceregal Lodge, Simla, 4th August 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

To—S. PRESTON, Esq., C.I.E., Secretary to the Government, Public Works Department.

I forward a letter from Mr. Eggar enclosing a form of advertisement for tenders, and a form for the tenders themselves, for the work of quarrying and supplying marble to the Trustees of the Victoria Memorial Hall at Calcutta. At the same time I forward a copy of the correspondence on this subject which has taken place since the discussion assumed its present phase.

The Viceroy will be much obliged if the Public Works Department will kindly advise him as to whether Mr. Eggar's proposals and the forms of advertisement and tender are suitable, and whether they may be accepted with or without modification.

I shall be glad to furnish you with any other papers which you may find that you may require and which we have in our possession.

[ENCLOSURES TO THE ABOVE LETTER.]

List of Enclosures.

1. Circular letter to the Trustees, dated 16th May 1905.
2. Letter from the Hon'ble Mr. A. A. Apear, dated 23rd May 1905.
3. Letter from Mr. W. D. Cruickshank, dated 25th May 1905.
4. Letter from Sir A. Fraser, dated 26th May 1905.
5. Letter from the Hon'ble Mr. R. T. Greer, dated 26th May 1905.
6. Letter from the Hon'ble Sir F. W. Maclean, dated 3rd June 1905.
7. Letter from Mr. S. M. Fraser, dated 5th June 1905.
8. Letter from Dr. E. Denison Ross, dated 6th June 1905.
9. Letter from Maharaj-Kumar P. C. Tagore, dated 7th June 1905.
10. Letter from Mr. H. C. Eggar, dated 12th June 1905.
11. Letter to Mr. R. L. Sevenoaks, dated 12th June 1905.
12. Circular letter to the Calcutta Trustees, dated 12th June 1905.
13. Letter from Sir P. Playfair, dated 16th June 1905.
14. Telegram from Mr. H. C. Eggar, dated 17th June 1905.
15. Letter from Mr. R. L. Sevenoaks, dated 19th June 1905.
16. Letter from Sir P. Playfair, dated 23rd June 1905.
17. Letter from Mr. R. L. Sevenoaks, dated 27th June 1905.
18. Letter to Mr. S. M. Fraser, dated 30th June 1905.
19. Letter from Sir W. Emerson, dated 30th June 1905.
20. Letter from Mr. S. M. Fraser, dated 4th July 1905.
21. Letter to Mr. S. M. Fraser, dated 7th July 1905.
22. Letter to Mr. R. L. Sevenoaks, dated 6th July 1905.
23. Letter to Mr. H. C. Eggar, dated 6th July 1905.
24. Letter from Mr. H. C. Eggar, dated 10th July 1905.
25. Letter from Mr. H. C. Eggar, dated 1st August 1905.

No. 148.

Dated Simla, the 7th August 1905.

From—S. PRESTON, Esq., C.I.E., Secretary to the Government of India, Public Works Department.

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I return the papers received, on Saturday afternoon, with your letter of the 4th instant regarding the forms of advertisement and tender for the supply of marble to the Trustees of the Victoria Memorial Hall. The following remarks occur to me in regard to them.

2. In paragraph 3 of the form of advertisement it is said that "30,000 cubic feet of marble in blocks and also 30,000 superficial feet of 3 inch facing marble and bonding stone" are to be supplied in the twelve calendar months following the date of the contract. This is distinct except that there is nothing to show what is to be the proportion of bonding stones in the 30,000 superficial feet. I judge from the correspondence that between every 15 inches of 3 inch facing marble there will be a line of 3 inch bonding stones. If this be correct, the superficial area of bonding stones will be one-sixth of the whole, and it is a matter for consideration whether it would not be better to say "25,000 superficial feet of 3 inch facing marble and 5,000 superficial feet of bonding stones measured on the exposed face."

3. Paragraph 3 of the advertisement then goes on to say that the contractor shall supply "all such additional marble as shall from time to time be required up to, but not exceeding, 50,000 cubic feet in one year." I think that any contractor will require to know the proportion of this which must be supplied in (a) rough blocks, (b) 3 inch facing stones, and (c) 3 inch bond stones. The difficult and expensive work will probably be the cutting and polishing of the 3 inch facing stones as a good deal will break up in the process, and it will be a very important matter for the contractor to know how much of this he has to arrange for.

4. A similar remark applies to the total quantity, 200,000 cubic feet, to be supplied. I think the contractor will require to know the quantity under each of items (a), (b), and (c) above.

5. *Paragraph 6.*—Should it not be distinctly stated that the marble to be supplied must be uniform in colour to the two specimens which may be finally selected for the facing and bond stones respectively.

6. *Paragraph 7.*—In my opinion the term "averaging" in the second line is too vague and might give rise to complications. It would cover anything from a pebble to a 100 ton block. I think myself it would be better to fix a minimum and maximum limit of size. It is quite possible it would be more economical to fix rates for different sizes of blocks instead of a rate for an average block of 25 feet cube. I am unable to say if this would be suitable. It will depend on the number of blocks of different sizes required as the superficial area to be dressed decreases in amount relatively to the contents, with the size of the block. I throw it out as a suggestion. If it is suitable paragraph 7 might read as follows:—

The prices to be stated in the tenders are to be per foot cube for blocks of marble roughly square of each of the following sizes—(a) from 5 to 15 cubic feet, (b) 15 to 25 cubic feet, (c) 25 to 35 cubic feet, (d) 35 to 45 cubic feet, and (e) 45 to 55 cubic feet, and per superficial foot for 3 inch facing marble, &c.

7. I am doubtful whether it is advisable to retain the words "or thereabouts" in lines 4 and 6 of paragraph 7. In all contracts it is, within my experience, better to have definite limits (maxima and minima).

8. The only other point which occurs to me is that nothing is said as to the degree of polish which is to be put on to the facing and bond stones, the only expression used is "sand facing." I am not conversant with the terms used in polished marble work. I presume Mr. Sevenoaks is satisfied that this sufficiently defines the degree of fineness to which the surface is to be worked up.

9. I also notice that nothing has been said as to the blocks or stones being flat on the face and dressed true with all angles and edges square. I presume this will be put in the specification.

10. If the suggestions in paragraphs 6 and 7 commend themselves to the Trustees, the form of tender would require some modification and might run somewhat as follows :—

I—For roughly squared blocks per foot cube—

(a) for blocks from 5 to 15 cubic feet

(b) „ „ 15 to 25 „ „

(c) „ „ 25 to 35 „ „

(d) „ „ 35 to 45 „ „

(e) „ „ 45 to 55 „ „

II—For facing marble 3 inches thick 15 inches high and any length from 2 feet to 4 feet including sand facing; per superficial foot.

III—For bonding stones 3 inches in height 8 inches in depth on the bed and any length from 2 feet to 4 feet including sand facing of the face which will be exposed in the work, per superficial foot of that face.

No. 149.

Dated Viceregal Lodge, Simla, 8th August 1905.

From—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy,

To—H. C. EGGAR, Esq.

I have to acknowledge your letter of the 1st August forwarding forms of advertisement and tender for the work of quarrying and supplying Makrana marble to the Trustees of the Victoria Memorial in Calcutta. The Viceroy sent your letter and its enclosures to the Public Works Department for the favour of their advice, and I enclose a copy of Mr. Preston's reply, dated 7th August 1905 which makes a number of suggestions on technical points. I shall be much obliged if you will show Mr. Preston's letter to Mr. Sevenoaks, in order that any alterations that may be deemed desirable may be carried out in the forms of advertisement and tender.

No. 150.

Dated 30, Dalhousie Square, Calcutta, 11th August 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I have your letter of the 8th instant enclosing a copy of Mr. Preston's suggestions on technical points in connection with the advertisement and tender for Makrana marble. In preparing the forms I followed Sir William Emerson's wording in the contract and specification in the case of the Marmor Company, and I understood from Mr. Sevenoaks, with whom I carefully discussed the details, that they were as full as they could be made under the circumstances. I made the draft advertisement as full as it is to avoid the necessity for a specification. I will go into the matter again with Mr. Sevenoaks and see if effect can be given to Mr. Preston's valuable suggestions in the absence of the information which, according to Sir William Emerson, will not be ready until the end of this year. I think on a first reading of Mr. Preston's letter of the 7th instant, that he is under the impression the Trustees have more information than they really possess and is not aware of their difficulty in this respect.

No. 151.

Carriage of Makrana Marble by Rail from Jodhpur to Howrah.

YOUR EXCELLENCY—

I spoke about the above subject to-day to Messrs. Douglas and Upcott at the house of the latter. Mr. Douglas assured me that there need be no anxiety as to the regular delivery of the marble by the Railway authorities. It may be accepted that the marble will be despatched regularly as it is received, and that there will be no delay *en route*.

(Sd.) R. NATHAN,—10-8-05.

I think that the above should be placed on record.

(Sd.) CURZON,—11-8-05.

No. 152.

Dated Viceregal Lodge, Simla, the 16th September 1905.

From—R. NATHAN, Esq., Private Secretary to the His Excellency the Viceroy,

To—ROBERT L. SEVENOAKS, Esq., Secretary to the Trustees, Victoria Memorial.

Your letter of the 10th April. I shall be much obliged if you will tell me when you will be in a position to send a report regarding the action of the weather on the specimen blocks of marble.

No. 153.

Dated 30 Dalhousie Square, Calcutta, 18th September 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C.I.E., Private Secretary to His Excellency the Viceroy.

I submit amended drafts of the forms of advertisement for tenders and tender for the supply of Makrana marble, in which I have given effect to Mr. Preston's suggested amendments so far as, in conference with Mr. Sevenoaks, it has appeared possible on the information in the possession of the Trustees.

The advertisement cannot of course be published until the concession from the Native State and the arrangements with the Railway administrations are completed, and all forms have been submitted to and accepted by the Trustees in meeting. As to the arrangement with the Railways I have no information: as to the concession I have received an inappropriate letter from some official signing for the Under Secretary in the Foreign Department, stating that the Under Secretary is directed to request that the necessary draft of the concession may be drawn up and submitted to that Department with as little delay as possible. I am dealing with this matter of the concession in a separate letter.

The original draft of the advertisement in paragraph 3 reads:—

“The contractor will be required to deliver to the Trustees at the site of the Memorial in Calcutta during the period of twelve calendar months from the date of the contract 30,000 cubic feet of marble in blocks and also 30,000 superficial feet of 3-inch facing marble and bonding stones.”

Mr. Preston in his letter of the 7th August 1905, suggests that it would be better, as affording more definite information to tenderers, to say—

“25,000 superficial feet of 3-inch facing marble and 5,000 superficial feet of bonding stones measured on the exposed face.”

He arrives at this by a calculation that the superficial area of bonding stones will be one-sixth of the whole. Mr. Sevenoaks, in a note I received from him, writes,—“As all these stones will be in superficial feet, slabs varying between 2' to 4' × 3" × 15" and 2' to 4' × 3" × 9" the quotation will be for superficial feet alone. It is only a matter of cutting so many slabs into

the lengths required, so the price will not vary in any way. Therefore for the present there is no necessity to define separately the quantity required." The calculation made by Mr. Preston could have been made by a tenderer on the original description. While I doubt if there exists any necessity for the adoption of the proposed amendment, I see no objection to its adoption in regard to the first year's supply, and in deference to Mr. Preston's view I have altered the paragraph and inserted his wording.

Mr. Preston, in reference to the latter portion of paragraph 3 of the original draft advertisement, which reads—

".....and after the expiration of such period all such additional marble as shall from time to time be required up to but not exceeding 50,000 cubic feet in any one year" suggests that any contractor will require to know the proportion of the 50,000 cubic feet which must be supplied in (a) rough blocks, (b) 3-inch facing stones, and (c) 3-inch bonding stones.

It should be borne in mind that the above wording has reference to a period subsequent to the first year's working, and to such marble as may be required. In my opinion, in the absence of the drawings, specifications and quantities which are awaited from the Architect, it would be most unsafe to attempt to define the proportions in which the 50,000 cubic feet is to be supplied, for at present, in the absence of such information, it is impossible to predicate what proportion will be in blocks, what in facing stones, and what in bonding stones. It seems to me to depend on the details of the design of the building. The proportions must, I submit, therefore and necessarily, be left to subsequent requirement. In my letter to you of the 11th August I said that I thought Mr. Preston was under the impression that the Trustees have more information than they really possess and was not aware of the difficulty. With all respect and while recognising the force of Mr. Preston's suggestion I do not feel justified in adopting it.

These remarks apply equally to the similar suggestion in the 4th paragraph of Mr. Preston's letter in reference to the total estimated quantity of 200,000 cubic feet of marble.

In the 5th paragraph of his letter Mr. Preston, in reference to paragraph 6 of the original draft advertisement, raises the question, whether it should not be distinctly stated that the marble to be supplied must be uniform in colour to the two specimens which may be finally selected for the facing and bonding stones respectively. I have given effect to this suggestion by stating generally in paragraph 5 of the amended draft advertisement now submitted, that "the marble is to be.....in all respects equal to samples to be approved by the Architect," though I think it was clearly implied by the wording of paragraph 6 of the original draft where reference is made to samples to be submitted for approval of the Architect.

In the 5th paragraph of his letter Mr. Preston also draws attention to the use of the term "averaging" in the second line of paragraph 7 of the original draft, as being too vague and as likely to give rise to complication. The words referred to are—

"The prices to be stated in the tenders are to be all round prices per foot cube for blocks of marble averaging 25 feet cube."

In drafting the original advertisement I was much troubled with regard to both the phrase "all round prices" and the term "averaging." They were taken from clause 17 of the draft of the Marmor contract and the 17th paragraph of the Specification annexed to it. It will be seen on reference to Sir William Emerson's letter to His Excellency of the 19th May 1905 what is meant by "averaging." Sir William there speaks of cube stones from 1 to 15 cubic feet, 15 to 20 cubic feet and from 30 to 40 cubic feet, the average of which is 25 cubic feet. I quite recognise that it would be better, as Mr. Preston remarks, to fix a minimum and maximum. The minimum we have in Sir William Emerson's letter, but the maximum is not known even to him, for in such letter he writes:—

"And for cube stones from 1 to 15 cubic feet, 15 to 20 cubic feet, 30 to 40 cubic feet and for any larger sizes that may be requisite."

In the draft advertisement I have adopted Mr. Preston's suggestion at the same time adhering to the dimensions mentioned by Sir William Emerson.

There is a peculiarity about these dimensions. You will notice that Sir William Emerson springs from 15 to 20 cubic feet to 30 to 40 cubic feet, thus omitting mention of the mesne dimension 20 to 30 cubic feet. From the use by him of the words "average 25 feet cube" in clause 17 of the draft Marmor contract, I assume the omission is intentional and that no blocks of the dimension 20 to 30 cubic feet will be required. If the dimension 20 to 30 cubic feet should be inserted the "average 25 feet cube" would not apparently be the average.

In paragraph 7 of his letter Mr. Preston states that in all contracts it is within his experience better to have definite limits, maxima and minima. To no one does this remark appeal more forcibly than to myself as a legal draftsman; but, as I have said, I have not been furnished with the maxima, and I cannot, therefore, state it. I have, however, confined the amendment in the draft to the dimensions given in Sir William Emerson's letter relying on the possibility that, if prices are stated for the dimensions given the ascertainment of prices of the intermediate or larger dimensions is a matter of ready calculation. It occurs to me that it may not be possible to transport cubes of larger dimensions than 30 to 40 feet by rail without constructing vehicles specially designed for the purpose.

In the same paragraph of his letter Mr. Preston expresses a doubt as to whether it is advisable to retain the words "or thereabouts" in lines 4 and 6 of paragraph 7 of the original draft advertisement. In inserting those words I followed a previous description. I have discussed the necessity for the use of these words with Mr. Sevenoaks. It appears they are intended to convey that the facing stones and bonding stones to be supplied may be longer than 4 feet. I have arrived with Mr. Sevenoaks to the conclusion that there is no reason beyond that I have stated for retaining the words and it is not a sufficient reason for retaining them, and I have accordingly struck them out.

In the 8th paragraph of his letter Mr. Preston points out that nothing is said as to the degree of polish which is to be put on to the facing and bonding stones. No polishing is required. On this Mr. Sevenoaks remarks,—“The expression ‘rubbed and finished to a finest possible sanded face’ is quite sufficient.”

Mr. Preston also points out that nothing has been said as to the blocks or stones being flat on the face and dressed true with all angles and edges square, and he presumes this will be put in the specification. This was intentionally omitted from the original draft advertisement, and is likewise omitted from the draft now submitted. The object in making the advertisement so full is to avoid the necessity for a specification. What is necessary in this respect will be contained in the contract. It will be unnecessary to stipulate for dressing the stones in the contract to be made on the tenders now contemplated, for such work will form part of the subject matter of the later and separate contract for working the marble according to specification after it is received at the site in Calcutta.

As will be seen by comparison, I have taken from the 3rd paragraph of the original draft the words, "with all faces to be exposed rubbed and finished to a finest possible sanded face" and have given greater prominence to this requirement by inserting it in a separate paragraph. (Paragraph 6 of the accompanying draft.) I have also in the 3rd paragraph of the accompanying draft added words taken from the draft Marmor contract with the object of showing with greater clearness that the supply after the first year is dependent on later requirement.

I was never altogether satisfied with the wording of paragraph 5 of the original draft advertisement, and I have taken the opportunity of altering it, and in its altered form it appears as paragraph 5 of the accompanying draft, in which also, as I have said, I have inserted the express provision that the marble to be supplied shall be according to approved samples.

[ENCLOSURE TO THE FOREGOING LETTER.]

VICTORIA MEMORIAL ACT, 1903.

To

Contractors and others.

1. PERSONS desirous of tendering for the execution of the work of quarrying and getting from quarries situated at or near Makrana in the Native State of Marwar or Jodhpur in Rajputana and of supplying to the Trustees of the Victoria Memorial in Calcutta all such marble, whether cube stones, facing stones, or bonding stones, as may from time to time be required by the Trustees for use in the erection of the Memorial may obtain a form of tender on application, on any day during business hours, at the office of the Superintending Architect in charge of the Victoria Memorial, Calcutta.

2. Such persons must at their own risk and expense obtain all information and satisfy themselves of all probable contingencies and generally of all matters which may in any way influence them in making a tender, and no extra allowance, compensation, or payment, beyond the amount mentioned in the tender or contract, will be made to the contractor should any matter or thing in respect of the work to be executed prove in any respect to be different to what the contractor may have anticipated or may have been led by any representation or condition to anticipate.

3. The contractor will be required to deliver to the Trustees at the site of the Memorial in Calcutta during the period of twelve calendar months from the date of the contract 30,000 cubic feet of marble in blocks and also 25,000 superficial feet of 3 inch facing marble and 5,000 superficial feet of bonding stones measured on the exposed face : and, after the expiration of such period, all such marble, whether cube stones, facing stones, or bonding stones, as, in addition to the quantities above mentioned, shall from time to time be required in writing, whether before or after the expiration of the aforesaid period, up to but not exceeding 50,000 cubic feet in any one year. The total quantity of marble that will be required is estimated at 200,000 cubic feet but the Trustees do not bind themselves to such estimate.

4. A concession in respect of the quarrying and getting of marble from the Makrana quarries has been granted by the Native State in favour of the Trustees and arrangements have been made on behalf of the Trustees with the Railway Administrations for facilities in transport, the particulars whereof can be ascertained on application as aforesaid. The contractor will be afforded the benefit of such concession and arrangements.

5. The contractor will be required to exercise the greatest care in the selection of the marble to be supplied. The marble selected is to be white marble with veins or splashes of grey or blue colour sufficient only to tone the white, with the exception of bonding stones which are to be selected with darker blue markings on the faced edge, and the marble is to be free from iron pyrites, flaws, vents, shakes or other defects, or large dark or colour spots or patches, and in all respects equal to samples to be approved by the Architect.

6. The exposed faces of the facing stones and bonding stones are to be rubbed and finished to a finest possible sanded face.

7. Tenderers will, on application as aforesaid, be furnished with a permit to enter upon and prospect the quarries and they must obtain therefrom samples of marble corresponding to the above description and submit them with their tenders for the approval of the Architect.

8. The prices to be stated in the tenders are to be as follows:—

(1) For roughly squared blocks per foot cube.

(a) for blocks from 1 to 15 cubic feet.

(b) for blocks from 15 to 20 cubic feet.

(c) for blocks from 30 to 40 cubic feet.

(2) For facing marble 3 inches thick 15 inches high and in lengths of from 2 feet to 4 feet including sand facing, per superficial foot.

(3) For bonding stones 3 inches thick 9 inches on the bed and in lengths of from 2 feet to 4 feet including sand facing of the face which will be exposed per superficial foot of that face.

9. Such prices are to include the cost of all materials, plant and labour in quarrying and getting marble at the quarries and of cutting and sand facing the marble at the quarries as required, the rent royalties and other charges payable to the Native State, the cost of conveyance of the marble to be supplied from the quarries to the rail, of the transport thereof and of all loading and unloading, and all other cost, charges and expenses in all incidental to the delivery of the marble to be supplied free at the site of the Memorial in Calcutta.

10. The Trustees do not bind themselves to accept the lowest or any tender. The acceptance of a tender will not be binding on the the Trustees until a contract in respect thereof shall have been duly executed.

11. The Contractor will be required to furnish security to the satisfaction of the Trustees for the due fulfilment of his contract.

12. Tenders are to be made on the prescribed form and to be delivered at the office of the Superintending Architect in charge of the Victoria Memorial, Calcutta, on or before the day of 1905.

CATHEDRAL AVENUE, MAIDAN, }
CALCUTTA : 1905. }

By order of the Trustees of the Victoria Memorial.

Superintending Architect in charge Victoria Memorial,

VICTORIA MEMORIAL ACT, 1903.

Tender.

For the execution of the work of quarrying and getting from quarries situate at or near Makrana in the Native State of Marwar or Jodhpur in Rajputana and of supplying to the Trustees of the Victoria Memorial in Calcutta all such marble whether cube stones, facing stones or bonding stones as may from time to time be required by the Trustees for use in the erection of the Memorial.

To

The Superintending Architect

in charge of the Victoria Memorial, Calcutta,

Cathedral Avenue, Bhowanipore, Calcutta.

SIR,

In response to your advertisement inviting tenders $\frac{I}{we}$ offer and undertake to quarry and get from quarries situate at or near Makrana in the Native State of Marwar or Jodhpur in Rajputana and to supply to the Trustees of the Victoria Memorial in Calcutta all such marble whether cube stones, facing stones or bonding stones as may from time to time be required by the Trustees for use in the erection of the Memorial at and for the following prices :—

	Rs.	as.	p.
1. For roughly squared blocks per foot cube
(a) for blocks from 1 to 15 cubic feet
(b) for blocks from 15 to 20 cubic feet
(c) for blocks from 30 to 40 cubic feet
2. For facing marble 3 inches thick 15 inches high and in lengths of from 2 feet to 4 feet, including sand facing per superficial foot.			
3. For bonding stones 3 inches thick 9 inches on the bed and in lengths of from 2 feet to 4 feet, including sand facing of the face which will be exposed, per superficial foot of that face.			

The above-mentioned prices include the cost of all materials, plant and labour in quarrying and getting marble at the quarries and of cutting and sand facing the marble at the quarries as required, the rent royalties or other charges payable to the Native State, the cost of conveyance of the marble to be supplied from the quarries to the rail, of the transport thereof, and of all loading and unloading, and all other cost, charges and expenses in and incidental to the delivery of the marble to be supplied free at the site of the Memorial in Calcutta.

In the event of this tender being accepted by the Trustees of the Victoria Memorial, $\frac{I}{we}$ undertake to enter into and execute a formal contract and a bond with two sureties for the due fulfilment of such contract to the satisfaction of the Trustees and in the forms presented by them.

$\frac{I}{we}$ have the honour to be,

SIR,

Your most obedient servant (s)

Dated 30 Dalhousie Square, Calcutta, 25th September 1905.

From—H. C. EGGAR, Esq.,

To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

I have written to you regarding the amendments in the forms of advertisement for tenders and tender. I now deal with the matter of the concession to be obtained from the Native State in regard to the quarrying of marble.

The Foreign Department sent me the correspondence with the Agent to the Governor-General in Rajputana with the request that I would prepare the necessary draft agreement between the Jodhpur Durbar and the Trustees of the Victoria Memorial. I do not annex copies of the letters as I imagine they are readily accessible to you at Simla.

I have drafted and now send you for consideration a form of concession. I have done the best I can upon the slender materials furnished. I do not submit the document as a complete draft, for doubtless alterations will be necessary, but I think it will serve to show what occurs to my mind as desirable.

Judging from the correspondence the Foreign Department are under the impression that they are asked to carry the matter of the concession through to the point of final completion of a formal agreement between the Durbar and the Trustees. This of course cannot be so. To avoid misunderstanding and confusion I would point out that the good offices of the Department are solicited for the conduct of the preliminary negotiations with the Durbar, which may extend to the provisional arrangement of the terms of the draft concession. When the preliminary negotiations have resulted in the terms being defined, such terms must be placed before the Trustees in meeting for consideration and acceptance. When the terms have been so considered and accepted, a draft concession giving effect to the terms can be definitely put forward for the "Durbar's formal consent thereto." The Trustees cannot be committed to the terms and to a draft concession until the matter has been deliberated upon in meeting.

There are some matters in the correspondence to which I conceive it necessary to invite attention.

As to the granting of the concession to the Trustees, the Agent, in paragraph 3 of his letter No. 962-C. of the 18th August 1905, writes,—

"... the Resident for the Western Rajputana States informs me that the Durbar are evidently prepared to grant the desired concession. He thinks, however, that a further examination of the question may reveal a possibility of litigation and trouble with local contractors and quarrymen who may be damaged and have to be compensated. I presume, however, that if this should unfortunately prove to be the case the Memorial Trustees would be willing to compensate the Durbar for any expense incurred by them and that a clause to that effect would be entered in the deed of concession."

To this the Foreign Department replied in their letter No. 3565-I. C. of the 2nd September 1905,—

"..... the Government of India do not anticipate any likelihood of litigation ensuing with local contractors and quarrymen. As stated in paragraph 5 of my letter No. 2786-I. C., dated the 18th July 1905, the grant of the concession to the Trustees does not mean the temporary extinction of the small private contractors, for the former will almost certainly be ready to purchase supplementary marble from contractors working other quarries, where the varieties of marble may be suitable for the special requirements of the building. The Government of India therefore do not consider it necessary to insert a clause in the agreement such as that suggested by you."

Such a clause would amount to an indemnity, and, in my opinion, the Trustees, acting in the capacity of Trustees, and as such dealing with the public funds dedicated to a particular purpose could not, under any circumstances, give an indemnity. Apart from this question, it is most essential, in the interests of the Trustees and the fund they control, that enquiry should be made as to the nature and extent of the rights acquired by local contractors and quarrymen, as it is not possible, in the absence of such information, to form any idea of the possibility or the improbability of litigation. The

quarrying operations of local contractors and quarrymen in actual progress may not be interrupted or interfered with, but it does not follow from this avoidance that the area to which such operations are at present confined represent the whole area, which may have been conceded to local contractors and quarrymen, and it is possible that rights may be encroached upon and acts of trespass may unintentionally be committed giving rise to litigation which will create liability on the part of the Trustees, occasion loss to the Trust, and impede the operations of the Trustees' contractor. The Agent for the Western Rajputana States has doubtless reason for his statement, and the Trustees could not, in the face of the warning conveyed in the Agent's letter, neglect the precaution of making the fullest enquiry and proceed to the completion of the concession regardless of it. The concession, unless it be in respect of an area entirely distinct, would necessarily be subject to previously acquired rights, so far as they extend in area and substance.

The statement in the latter of the above quotations, that the Trustees will almost certainly be ready to purchase supplementary marble, is, I submit, overdrawn. The Trustees will not be ready to purchase supplementary marble from the local contractors and quarrymen, for the reason that the supply of marble will be entirely in the hands of their contractor, and there will be no "supplementary" marble. There will be nothing to prevent the Trustees' contractor, if he so determines, from arranging with local contractors and quarrymen to supply him from their quarries with suitable marble, but such an arrangement is a matter for the contractor alone, and it will be entered upon at his risk.

In passing I note that the proposed contract for marble, though relating to all marble required for the building, does not include marble required for sculpture. The contract will have reference to cube stones, facing stones, and bonding stones. No decision has been come to regarding marble for sculpture, and I think it probable that such marble, the only "supplementary" marble, may not be obtained from Makrana.

The correspondence conducted by the Foreign Department fixes, in a way, the rate of royalty at 2 annas a maund, it gives partial information as to the rent, and it states more clearly that the Durbar will expend Rs. 5,000 in constructing a railway siding from the Makrana Station to the quarries.

For the purposes of the concession the area should be surveyed, and a plan should be prepared showing definitely the limits of the area to be included in the concession and the siding to be constructed.

Though the rate of royalty is fixed at 2 annas a maund, it is not stated upon what it is chargeable. In the accompanying draft I have made it payable in respect of marble worked, gotten, taken, and removed.

As to rent, it is, according to the correspondence, to be the same rent as is paid by private contractors, and mention is made of 8 annas to Rs. 2 per yard along the strike. This is indefinite. What are the conditions under which the rent varies from 8 annas to Rs. 2 a yard?

It should be borne in mind that the concession under discussion differs from ordinary concessions in that the Trustees are not entering and cannot enter on an adventure, getting all marble that is available and disposing of it to the best advantage, but they are seeking, and will, in mining phraseology, work and get only marble of a particular description suitable to their requirements. All marble worked and gotten which is unsuitable will remain the property of the Native State.

I notice in the correspondence that the chance of obtaining the contractors' machinery at favourable rates, when it is done with, is put forward as one of the inducements for granting the concession at a lower royalty. This will be a matter entirely for the contractors, and I have left such possibility open in the accompanying draft. I doubt if the contractors' machinery when their contract is completed will be of any attractive value.

As to the construction of the railway siding, I have provided in the accompanying draft that it shall be constructed at the expense of the Native State.

It is said in the correspondence that the Durbar will expend Rs. 5,000 in the construction, using old materials. What if, as is probable, the siding costs more than Rs. 5,000, who is to provide the balance? The Durbar should, I think, undertake to construct the siding, and their undertaking should not be limited to Rs. 5,000.

[ENCLOSURE TO THE ABOVE LETTER.]

THIS INDENTURE made the day of 1905 BETWEEN HIS HIGHNESS RAJ RAJESHWAR MAHARAJA-DHIRAJ SARANAD RAJHAI SREE SARDAR SINGHJI BAHADUR OF JODHPUR in the Native State of Marwar in Rajputana hereinafter called "the Maharaja" which expression shall where the context so requires or admits include his heirs, representatives, and assigns of the one part and the TRUSTEES OF THE VICTORIA MEMORIAL a body corporate constituted by Act X of 1903 (the Victoria Memorial Act 1903) of the Legislative Council of India hereinafter called "the Trustees" (which expression shall where the context so requires or admits include their successors and assigns) of the other part WHEREAS the Trustees having in exercise of the powers conferred by the said Victoria Memorial Act 1903 decided to erect upon the Maidan at Calcutta a building (to be known as the Victoria Memorial) as a memorial of the life and reign of Her Majesty Victoria of the United Kingdom of Great Britain and Ireland Queen and Empress of India and at a meeting of the Trustees held on the day of 1905 it was resolved that Indian marble should be employed for certain purposes and works in the said building and WHEREAS on application being made by the Trustees through the Government of India the Maharaja has decided to concede and grant to the Trustees such right, liberty, license and authority as is hereinafter mentioned and contained for the purpose of enabling the Trustees to win work and get from the aforesaid lands and premises all such marble as they may require for their purposes and works in the erection of the said building AND WHEREAS¹

NOW THIS INDENTURE WITNESSETH AS FOLLOWS :—

I. In consideration of the rent and royalties hereinafter reserved and of the covenants hereinafter contained and on the part of the Trustees to be observed and performed the Maharaja (subject and without prejudice to²

hereby grants to the Trustees full right, liberty, license and authority to win work and get from the lands and premises situate at or near Makrana in the said Native State of Marwar delineated on the plan³ annexed hereto and marked and thereon coloured all such marble as may as regards description, class, quality or quantity from time to time be required by the Trustees for use in the erection of the said building at Calcutta to be known as the Victoria Memorial.⁴

II. There are included in the said grant the liberties following :—

1. To enter upon the said lands and premises and to use the now existing quarries and works and to make, dig and drive thereon and therein any new quarries, pits, levels drains, watercourses and other works as well below⁵ as above ground necessary or convenient for working and getting the said marble.

¹ If any rights have been acquired by local contractors and quarrymen over or in respect of the area to be included in this concession, the nature and extent of such rights or of the grant or grants in respect of them should be recited here. It may be that the area included in this concession is distinct from the area over which the rights of local contractors and quarrymen extend, in which case no rental of such rights, &c., will be necessary.

H. C. E.

² Appropriate wording will be inserted here, shortly descriptive of the rights acquired by local contractors and quarrymen, and consistent with the recital, should such rights be found to extend over or affect the area included in this concession.

H. C. E.

³ The plan here referred to should show not only the area included in this concession, but also the line of railway siding from the station to the included area.

H. C. E.

⁴ This concession differs from ordinary concessions in that the Trustees are not entering upon an adventure, getting all marble that is available and disposing of it to advantage, but only getting such marble as they require.

H. C. E.

⁵ Quarry, below ground?

2. Upon the said lands and premises or any part thereof to erect and build such buildings, engines, machinery and conveniences as may be necessary or convenient for the purposes aforesaid and such dwelling houses for workmen and other persons employed by the Trustees or their contractors as may be requisite or desirable in or in connection with the working and getting of the said marble.

3. To use, maintain and repair any tramways or trolly ways or other roads already made upon the said lands and premises, and upon the said land and premises to make use and repair any new tramways or trolly ways or other roads or ways which may be necessary or convenient for the effectual working and getting of the said marble and carrying away the same.

4. To place, store and stack upon the said lands and premises any marble obtained therefrom and also to heap waste and rubbish produced therefrom in the course of the works hereby authorised.

5. At all times to use the railway siding depicted on the said plan⁶ annexed hereto and marked _____ extending from Makrana Station on the Jodhpur-Bikanir Railway to the said lands and premises to be constructed by the Maharaja pursuant to the covenant on his part hereinafter contained with liberty for the Trustees by their contractors, agents, workmen and servants free of charge to the Trustees to convey over the said railway siding in suitable wagons or trucks drawn or propelled by horses, steam or other motive power or by any mechanical or electrical contrivance all such marble obtained in the course of the works hereby authorised as the Trustees or their contractors may require to be carried away from the said lands and premises for despatch by the said Jodhpur-Bikanir Railway and also free of charge to the Trustees to convey over the said railway siding to and from the said lands and premises all materials, machinery, plant, stores and things required for use in developing or working the quarries upon the said lands and premises or in connection with the purposes aforesaid.

6. Generally, to do in or upon the said lands and premises whatever may be necessary or convenient for working, getting making serviceable and carrying away all marble required by the Trustees and for obtaining the full benefit of the rights, liberties, and privileges hereby granted.

III. There is excepted and reserved to the Maharaja the property and right in and to all marble not required by the Trustees for the purposes aforesaid which in the course of the works hereby authorised shall be worked and gotten by the Trustees from the said lands and premises and all mines and minerals lying within or under the said lands and premises.

IV. There are also excepted and reserved to the Maharaja and all persons authorised by him the following liberties :—

1. Free liberty with or without wagons or trucks howsoever drawn or propelled to use the said railway siding extending from the Makrana station to the said lands and premises to be constructed as aforesaid.

2. Free liberty with or without horses cattle-carts, trucks, trollies or vehicles to use any tramways, roads or other ways now upon the said lands and premises and to cross any tramways trolly ways, roads or other ways to be made upon the said lands and premises under the authority of these presents.

V. The right, liberty, license and authority hereby granted shall be held and exercised by the Trustees from the date of these presents until such time as the same shall be determined as hereinafter provided.⁷

VI. The Trustees shall during the continuance of the right, liberty, license and authority hereby granted pay to the Maharaja the following sums hereinafter referred to as rent and royalties.

1. A footage rent of Rs. _____ for every yard of marble which shall be worked and gotten from the said lands and premises under the authority hereby granted whether⁸ such marble shall or shall not be such as the Trustees may require for their purposes and works in the erection of the said building such distance for the purpose of ascertaining the amount of footage rent payable being measured⁹ in the direction of a horizontal line drawn in the middle plane of the strata whence marble shall be worked and gotten. The said footage rent shall be paid half-yearly on the _____ day of _____ and the _____ day of _____ in each year during the continuance of the grant hereby made in respect of the operations of the preceding half year.

2. A royalty of two annas for every _____¹⁰ maund of marble worked, gotten, taken and removed from the said lands and premises under the authority hereby granted by or on behalf

⁶ See note (3).

⁷ It will, I think, be unnecessary to specify any term.

H. C. E.

⁸ This appears to be necessarily so.

H. C. E.

⁹ This description is submitted subject to correction.

H. C. E.

¹⁰ What maund.

H. C. E.

of the Trustees for their purposes and works in the erection of the said building such royalty to be paid half-yearly on the days hereinbefore appointed for the payment of the said footage rent.

VII. The Trustees to the intent that the obligations may continue throughout the continuance of this grant hereby covenant with the Maharaja as follows :—

1. To pay the rent and royalties hereby reserved at the times and in manner aforesaid.
2. To work the now existing quarries and all new quarries to be opened on the said lands and premises efficiently and fairly and according to the most approved manner of working undertakings of a liker nature.
3. To permit the agent of the Maharaja deputed for such purpose with or without surveyors, workmen and other persons at all reasonable times to enter upon, inspect and examine the said lands, quarries and premises and every part thereof for the purpose of ascertaining whether the quarries are being worked efficiently and fairly in accordance with this grant and in the event of any inefficient or unfair working being in the opinion of the agent of the Maharaja ¹¹ found therein upon notice in writing thereof to amend the same within one calendar month.
4. To cause the weight of all marble at any time about to be taken and removed by virtue of this grant from the said lands and premises to be ascertained to the satisfaction of the agent of the Maharaja ¹² and not to remove or suffer to be removed any marble from the said lands and premises without the weight thereof being so ascertained.
5. To cause to be kept at a convenient place on the said lands and premises proper books of account wherein shall be entered the quantities and weight of marble gotten, taken and removed from the said lands and premises under and by virtue of this grant with the dates of such taking and removal and such other particulars as may be convenient for ascertaining the amount of the royalties payable under this grant and to permit the agent of the Maharaja deputed for such purpose at all reasonable times to inspect the said books of account and to take copies thereof, or extracts therefrom and within 14 days after each of the days hereinbefore appointed for payment of the said footage rent to make out and deliver to the agent of the Maharaja deputed to receive the same a sufficient abstract of the said books of account for the preceding half-year showing the amount of royalty then payable.
6. Not to interfere with the marble mines and minerals lying within or under the said lands and premises or to prejudicially affect the working or the conveyance and disposal of the produce thereof save so far as may be necessary for the due exercise and enjoyment of the rights and liberties hereby granted.
7. Not to assign the right, liberty, license and authority hereby granted.¹³
8. Upon the determination of this grant to deliver up the said lands and premises and the quarries which shall then be in or upon the same in such state and condition (unavoidable accidents excepted) as that the same may be available for getting therefrom the marble which may then remain therein ungotten.

VIII.—The Maharaja hereby covenants with the Trustees as follows :—

1. The Trustees paying the rent and royalties and observing and performing the several covenants on their part herein contained shall peaceably hold and enjoy the benefit right, liberty, license and authority hereby granted without any interruption by the Maharaja or any person rightfully claiming under or in trust for him.
2. The Maharaja will at his own expense and with all reasonable expedition cause to be well, substantially and appropriately constructed a railway siding extending from the Makrana Station on the Jodhpur-Bikanir Railway to the said lands and premises along the course delineated for that purpose in the said plan ¹⁴ annexed hereto and marked with all necessary gutters, culverts and drains and from time to time cause the same to be repaired and all acts and, things to be done necessary for the maintenance of the said railway siding so to be contracted in proper order and condition.

IX. It is hereby expressly agreed as follows :—

1. If any rent or royalty hereby reserved or any part thereof shall be unpaid for 3 calendar months after becoming payable (the same having been first formally demanded) then and in such case it shall be lawful for the Maharaja by notice in writing to declare this grant determined and thereupon this grant shall absolutely determine but without prejudice to the right of action of the Maharaja in respect of any prior breach of the covenants of the Trustees herein contained.

¹¹ This may prove a disadvantage, the agent may raise unnecessary objections and delay in despatch may be occasioned.

H. C. E.

¹² There may be a disadvantage in this. The agent may not always be at hand, or he may raise unnecessary objections what is intended in this respect.

H. C. E.

¹³ The agreement to be made with the contractors will not be an assignment.

H. C. E.

¹⁴ See Note. ³

H. C. E.

2. If the Trustees shall desire at any time hereafter to determine this grant and shall give to the Maharaja 3 calendar months' notice in writing of such their desire and shall up to the time of such determination pay the rent and royalty and perform and observe the covenants on their part hereinbefore reserved and contained then immediately on the expiration of the period of such notice this grant and everything herein contained shall cease and be void save as regards matters to be done and adjusted at or after the determination thereof.

3. On the determination of this grant whether by the Maharaja under Clause IX (1) or by the Trustees under Clause IX (2) hereof (unless an agreement of a different purport or effect shall have been or shall be arrived at between the Maharaja and the Trustees or their contractors as the case may be) it shall be lawful for the Trustees or their contractors as the case may be at any time within 3 calendar months after such determination to remove all buildings, engines, machinery, tramways or trolly ways which they may have constructed or erected and all moveable machinery, plant, articles and things belonging to them which may on such determination be upon the said lands and premises provided that if this grant be determined by the Maharaja pursuant to Clause IX (1) hereof the right of removal in this clause mentioned and contained shall not be exercised or exercisable unless the claim of the Maharaja in respect of arrears of rent or royalty or for breach of any covenant shall have been first satisfied and discharged. If the claim of the Maharaja in respect of arrears of rent or royalty or for breach of any covenants shall be disputed the time within which the right of removal under this clause shall be exercisable shall be extended for 3 months from the date of the settlement or decision of such dispute.

4. A notice to be given to the Maharaja shall be sufficiently given if forwarded by registered post addressed to ¹⁵

and a notice to be given to the Trustees shall be sufficiently given if forwarded by registered post addressed to the Superintending Architect in charge Victoria Memorial, Cathedral Avenue Bhowanipore, Calcutta. Any such notice shall be deemed to be given at the time when in due course of post it would be delivered at the address to which it is sent.

In witness whereof the ¹⁶

and the Trustees have caused their common seal to be hereunto affixed.

The common seal of the Trustees of the Victoria }
Memorial was affixed to the above-written Indenture }
in the presence of

¹⁵ Who will be the proper officer to receive the notice.

H. C. E.

¹⁶ In what form will the deed be executed by or on behalf of the Maharaja.

H. C. E.

No. 155.

No. 4191-I. C., dated Simla, the 10th October 1905.

From—S. M. FRASER, Esq., C. I. E., Offg. Secy. to the Govt. of India, Foreign Dept.

To—THE HON'BLE MR. E. G. COLVIN, Agent to the Governor-General, Rajputana.

With reference to the correspondence ending with Foreign Department letter No. 3565-I. C., dated the 2nd September 1905, I am directed to forward herewith a draft form of the concession to be obtained from the Jodhpur Durbar in regard to the quarrying of marble for the construction of the Victoria Memorial Hall.

2. This draft, which has been prepared on behalf of the Trustees, should now, I am to request, be forwarded to the Durbar for consideration of the various points alluded to below, and for the suggestion of any alterations or additions which they may wish to see introduced. It will be understood by them that the functions of the Government of India at the present stage are limited to facilitating the provisional arrangement of the terms of the draft concession. After the preliminary negotiations have resulted in the terms being defined, such terms will be placed before the Trustees in meeting for consideration and acceptance, when a draft concession giving effect to them will be definitely put forward for the Durbar's formal consent.

3. The majority of the points on which further information is required will be understood from the marginal notes on the draft agreement. Great importance is attached by the Government of India to obtaining the reply of the Durbar as early as possible in a complete shape, and in order to push the matter through with the least delay, the first step needed is that the area to be included in the concession should be surveyed, and a plan prepared showing definitely its limits and the siding to be constructed. For this purpose I am to suggest that the Jodhpur State Engineer, accompanied by the Durbar revenue official responsible for the working of the marble quarries, should be deputed to Makrana to meet an agent appointed on behalf of the Trustees, who will be able to explain, for the purpose of determining the area to be included in the concession, the quantities of marble which will be required.

4. At the same time the Durbar officials should be instructed to inquire into the question whether the area to be set aside for the concession will include any portion of the quarry over which local contractors and quarrymen will still retain any rights at the time when work comes to be started for the Victoria Memorial, or if thought preferable, on the date when the agreement is finally signed. In paragraph 3 of the letter from this Department of 2nd September 1905, referred to, the Government of India expressed the opinion that they did not anticipate the likelihood of litigation ensuing, but, as they are now advised upon behalf of the Trustees, the precaution should not be omitted, before proceeding to the completion of the concession, of making full inquiry into the nature and extent of the rights which may have been assigned to local contractors and quarrymen, with a view of estimating the possibility or improbability of litigation. Should it be found that such rights have to be reckoned with, I am to request that the money compensation necessary to buy out the local contractors and workmen may be definitely assessed and reported simultaneously with the other information now called for.

The draft agreement is silent on the subject of the possible claims for compensation referred to and the proposals of the Durbar and your recommendations for their treatment will be awaited. In this connection, with regard to the remarks in the concluding portion of paragraph 3 of the letter from this Department, already cited, about the probable purchase of supplementary marble from contractors working other quarries, I am to add that although there will be nothing to prevent the Trustees' contractor, if he so determines, for arranging with local contractors and quarrymen to supply him from their quarries with suitable marble, such an arrangement will be for the contractor alone, and it will be entered upon at his risk only.

5. Two other important points should be considered and settled at the same time, *viz.*—

- (1) The probable cost of constructing the siding, as to which at present it is merely stated that the Durbar are prepared to lay out Rs. 5,000 on this object.
- (2) A clear statement of the rent chargeable. This, it is understood, varies from 8 annas to Rs. 2 per yard along the strike according to the quality of the marble, but a definite scale should now be laid down.

6. I am to request the favour of your informing me by telegraph as soon as possible of the date by which the Durbar officials will find it convenient to meet the representative of the Trustees at Makrana for the purposes indicated above.

No. 156.

Dated Simla, the 13th October 1905.

From—T. H. HOLLAND, Esq., F. R. S., A. R. C. S., F. G. S., Director, Geological Survey of India.

To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

I have ordered the weathering tests to be closed in Calcutta, and the specimens to be weighed and described. If His Excellency would like to see the specimens, I could have them sent to Simla next week. The tests for porosity showed a distinct advantage for the Indian specimens; but I expect that one monsoon will be insufficient to show marked differences in their resistance to the weather. The following are the average results for porosity :—

			Water absorbed : per cent. of weight.
Sagyin, Burma	...	...	... 0228
Makrana, Rajputana	...	...	... 0305
Tonkra, „	...	...	... 0320
Mergui, Burma	...	...	... 0600
Sicily	...	...	... 0740
Pentelikon	...	...	... 0744
Skyros	...	...	... 0781
Carrara	...	...	... 1069

No. 157.

Dated Simla, the 22nd October 1905.

From—T. H. HOLLAND, Esq., F. R. S., A. R. C. S., F. G. S., Director, Geological Survey of India.

To—R. NATHAN, Esq., C. I. E., Private Secretary to His Excellency the Viceroy.

I received the list of weights last night of the marble specimens which were exposed to the monsoon in Calcutta from July 30th to October 18th, and have now worked out the results of the tests made for porosity, loss of weight by solution, and loss of weight by the action of the monsoon. The specimens exposed to the weather have still to be examined microscopically and chemically in comparison with the duplicates which are sealed up in my Calcutta office; but I send the figures at once, as His Excellency may wish to see them before he leaves.

To equalize the conditions as much as possible, all the specimens were cut to the same shape and size, and their surfaces were smoothed as nearly as possible to the same degree. To eliminate the personal element, the weights

before and after the tests were determined by independent officers ignorant of one another's results, and although the quantities of water absorbed, and of marble lost by solution, are small, the experimental error in each case is probably not over one per cent.

I will discuss the doubtful points, and will give an estimate of the actual value of the experiments when sending my full report later on to the Trustees. The figures now sent are merely for the information of His Excellency, and I think they may be accepted as a correct expression of the relative average merits of the specimens examined: they place the marbles exactly in the order I have already predicted from a consideration of their structural characters. Sagyin and Makrana take the first and second places, whilst Mergui falls amongst the European marbles in one test only.

I am sorry that I could not obtain more than two samples of Pentelikon marble, but as they were those sent out by Marmor Limited, it may be safely assumed that they are not below the average quality of their products.

[ENCLOSURE TO THE ABOVE LETTER.]

Summary of tests made on marble samples for Porosity, Loss by solution and Loss by weathering.

				Absorption of water. (a)	Loss of weight by solution in water. (b)	Loss of weight by weathering (c)
				Per cent.	Per cent.	Per cent.
Sagyin, Burma	...	...	...	·0228	·0061	·0246
Makrana, Rajputana	...	...	...	·0305	·0115	·0247
Mergui, Burma	...	...	...	·0608	·0197	·0258
Pentelikon ...	...	...	...	·0743	·0149	·0278
Skyros ...	...	...	...	·0781	·0210	·0483
Carrara ...	...	...	...	·1078	·0152	·0771
Sicily ...	...	...	...	·0740	·0130	·0298

(a) By soaking for 24 hours in water.

(b) Do. do.

(c) By exposure to the Monsoon at Calcutta from July 30th to October 18th, 1905.

Order of merit of average results.

Porosity.				Solubility.		Weathering.
Sagyin	...	...	...	Sagyin	...	Sagyin.
Makrana	...	...	...	Makrana	...	Makrana.
Mergui	...	...	...	Sicily...	...	Mergui.
Sicily	...	...	...	Pentelikon	...	Carrara.
Pentelikon	...	...	...	Carrara	...	Pentelikon.
Skyros	...	...	...	Mergui	...	Sicily.
Carrara	...	...	...	Skyros	...	Skyros.

Absorptive capacity (Porosity) of Marbles.

Serial No.	Locality.			Specific Gravity.	Weight of sample.	Water absorbed in 24 hours.	Absorption per cent.
					Grammes.	Grammes	
1	Sagyin	...	...	2.740	34.1355	.0064	.0187
8	Do.	...	...	2.722	33.8312	.0098	.0290
12	Do.	...	...	2.733	34.1366	.0071	.0208
	Average	...	...	...	34.0344	.0077	.0228
4	Makrana	...	...	2.723	35.9528	.0118	.0328
9	Do.	...	...	2.731	37.7348	.0183	.0485
11	Do.	...	...	2.760	40.5415	.0075	.0185
13	Do.	...	...	2.726	36.8306	.0160	.0434
15	Do.	...	...	2.728	35.1625	.0146	.0415
16	Do.	...	...	2.735	37.9277	.0025	.0066
22	Do.	...	...	2.732	31.8582	.0072	.0226
23	Do.	...	...	2.735	35.0274	.0115	.0328
24	Do.	...	...	2.736	35.0248	.0100	.0285
25	Do.	...	...	2.734	35.6669	.0108	.0303
	Average	...	...	...	36.1727	.0110	.0305
2	Mergui	...	...	2.740	35.7987	.0139	.0388
3	Do.	...	...	2.723	40.8766	.0322	.0788
20	Do.	...	...	2.719	32.6221	.0204	.0625
	Average	...	...	...	36.4328	.0222	.0608
7	Pentelikon	...	...	2.721	38.4632	.0282	.0733
17	Do.	...	...	2.725	25.8328	.0195	.0755
	Average	...	...	...	32.1505	.0239	.0743
18	Skyros	...	...	2.752	22.4047	.0175	.0781
6	Carrara	...	...	2.726	39.6940	.0368	.0927
10	Do.	...	...	2.727	36.8471	.0652	.1769
19	Do.	...	...	2.729	34.5917	.0273	.0789
21	Do.	...	...	2.730	31.9339	.0251	.0786
26	Do.	...	...	2.730	31.6814	.0340	.1073
	Average	...	...	...	34.9496	.0377	.1078

Loss by solution in ordinary water for 24 hours. Marble specimens.

Serial No.	Locality.				Original weight of sample.	Loss of weight by solution in water for 24 hours.	Loss of weight per cent.
					Grammes.	Grammes.	
1	Sagyin	...	...	...	34.1355	.0025	.0073
8	Do.	...	...	...	33.8312	.0025	.0074
12	Do.	...	...	...	34.1366	.0012	.0035
			Average	...	34.0344	.0021	.0061
4	Makrana	...	...	...	35.9528	.0073	.0203
9	Do.	...	...	...	37.7348	.0016	.0042
11	Do.	...	...	...	40.5415	.0015	.0037
13	Do.	...	...	...	36.8306	.0021	.0057
15	Do.	...	...	...	35.1625	.0041	.0116
16	Do.	...	...	...	37.9277	.0024	.0063
22	Do.	...	...	...	31.8582	.0054	.0169
23	Do.	...	...	...	35.0274	.0049	.0140
24	Do.	...	...	...	35.0248	.0061	.0174
25	Do.	...	...	...	35.6669	.0049	.0137
			Average	...	36.1727	.0040	.0115
2	Mergui	...	...	...	35.7987	.0082	.0229
3	Do.	...	...	...	40.8766	.0088	.0215
20	Do.	...	...	...	32.6221	.0045	.0138
			Average	...	36.4328	.0072	.0197
7	Pentelikon	...	...	...	38.4682	.0064	.0166
17	Do.	...	...	...	25.8328	.0033	.0128
			Average	...	32.1505	.0048	.0149
18	Skyros	...	...	...	22.4047	.0047	.0210
6	Carrara	...	...	...	39.6940	.0062	.0156
10	Do.	...	...	...	36.8471	.0051	.0138
19	Do.	...	...	...	34.5917	.0060	.0173
21	Do.	...	...	...	31.9339	.0053	.0166
26	Do.	...	...	...	31.6814	.0040	.0126
			Average	...	34.9496	.0053	.0152

Loss of weight of Marbles from exposure to the Monsoon at Calcutta from July 30th to October 18th, 1905.

Serial No.	Locality.			Weight before exposure.	Weight after exposure.	Loss of weight by weathering.	Loss per cent. of original weight.	
				Grammes.	Grammes.	Grammes		
1	Sagyin	...	...	34 1330	34 1245	·0085	·0249	
8	Do.	...	...	33 8287	33 8190	·0097	·0286	
12	Do.	...	...	34 1354	34 1285	·0069	·0188	
	Average	...	...	34 0324	34 0240	·0084	·0246	
4	Makrana	...	..	35 9455	35 9371	·0084	·0234	
9	Do.	...	...	37 7332	37 7251	·0081	·0215	
11	Do.	...	...	40 5400	40 5306	·0094	·0232	
13	Do.	...	...	36 8285	36 8207	·0078	·0212	
15	Do.	...	..	35 1584	35 1490	·0094	·0268	
16	Do.	...	...	37 9253	37 9129	·0124	·0324	
22	Do.	...	...	31 8523	31 8452	·0076	·0239	
23	Do.	...	...	35 0225	35 0136	·0089	·0254	
24	Do.	...	...	35 0187	35 0095	·0092	·0263	
25	Do.	...	...	35 6620	35 6538	·0082	·0230	
	Average	...	...	36 1687	36 1598	·0089	·0247	
2	Mergui	...	...	35 7905	35 7834	·0071	·0199	
3	Do.	...	...	40 8678	40 8574	·0104	·0254	
20	Do.	...	...	32 6176	32 6069	·0107	·0328	
	Average	...	...	36 4253	36 4159	·0094	·0253	
7	Pentelikon	...	...	38 4618	38 4532	·0086	·0223	
17	Do.	...	...	25 8295	25 8202	·0093	·0359	
				32 1456	32 1367	·0089	·0278	
18	Skyros	...	...	22 4000	22 3900	·0100	0483	From speci- mens sent by Marmor, Ltd.
6	Carrara	...	...	39 6878	39 6781	·0097	·0244	
10	Do.	...	...	36 8420	36 8308	·0112	·0304	
19	Do.	...	...	34 5857	34 5770	·0087	·0252	
21	Do.	31 9286	31 9204	·0082	·0257	
26	Do.	31 6774	31 6678	·0096	·0303	
	Average	34 9443	34 9348	·0095	·0271	

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